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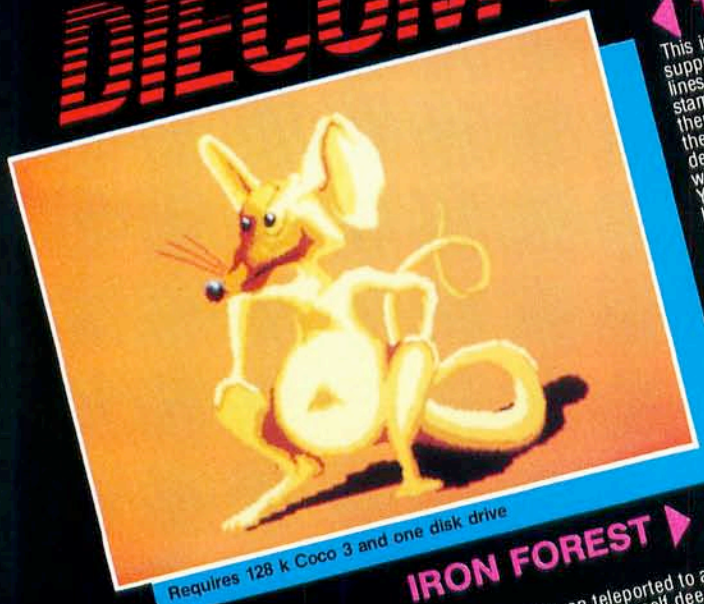

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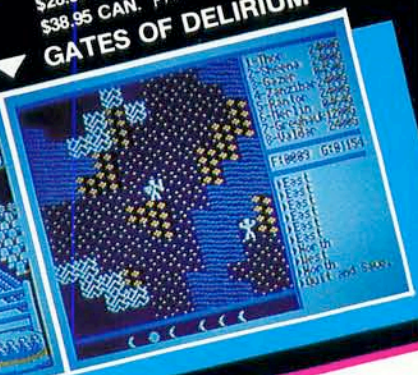

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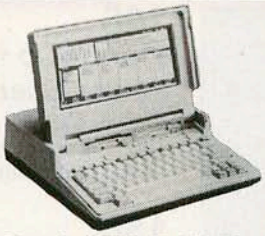

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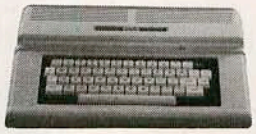

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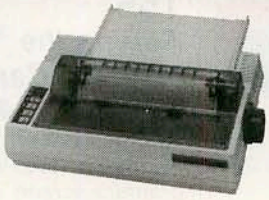

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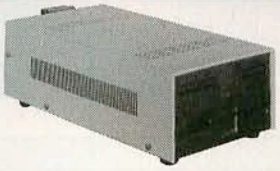

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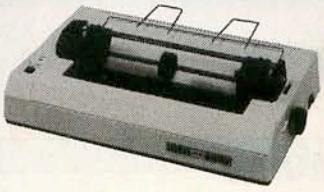

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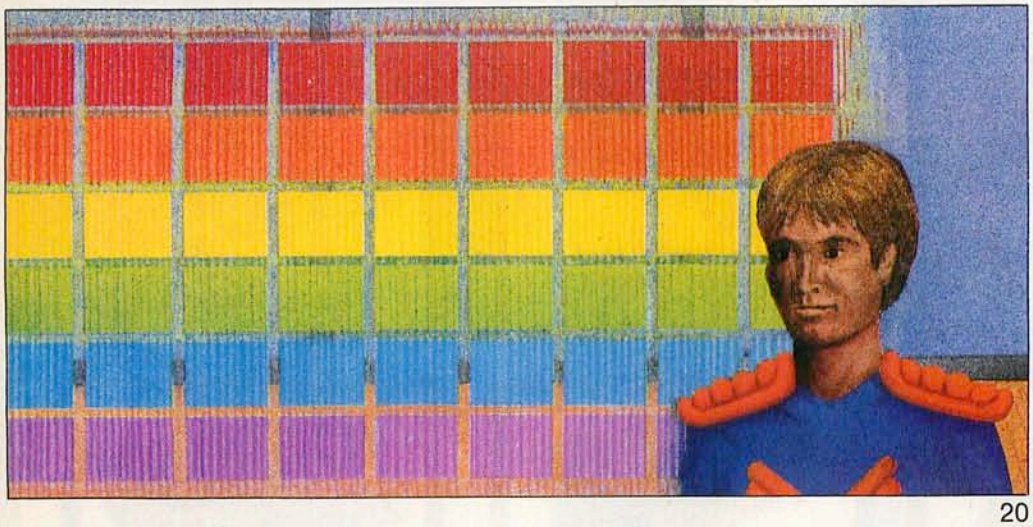

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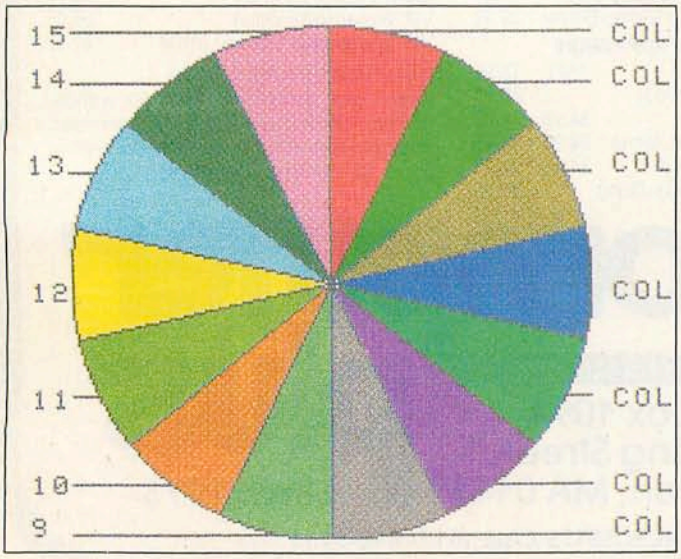

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Editor:

Here are some comments relevant to the Rule of 78's that users of Jack W. Eizenga's program of the same name (March '88 RAINBOW, Page 100) may find of value.

The rule (also known as the Sum-of-the-Digits Method) has been outlawed in several states due to its unfairness to the consumer. The battle to defeat such a measure was led by lending institutions, which have managed to keep it intact in most other states. A few states have restricted its use to loan payback periods under three or four years.

A legal review article on R-78, originating at Boston University Law School, concludes it is unfair to consumers when interest rates are fairly high and payback term is fairly long, and especially when both these conditions exist. The article ends with a general plea to the legal community to help abolish the rule entirely.

The only notice in a loan contract that the Rule of 78's will be invoked on early payoff is a bare mention of the rule. By law, it has to be so mentioned, and can be found in the fine print if one looks closely. Lenders are *not* required to explain it and won't, unless pressed. Even then, most cannot offer an easy explanation because of the relative complexity of the concept and an understandable reluctance to reveal to a borrower how he or she will be ripped off (under certain conditions) if an early payoff becomes possible.

At least one supposedly authoritative source of information on the rule, a weighty tome called *Thorndike's Encyclopedia of Banking and Financial Tables*, is misleading in its comments on the rule. Essentially, it says that the approximate payoff figures of a loan are so close to those derived from the usual accrual method of amortization that any minor differences can be ignored. That statement is true for short-term loans with reasonable interest rates. It is totally false for long-term loans and higher interest rates — a fact not mentioned.

Mr. Eizenga seems to knuckle under a bit to the lenders in his statement that calculating the Rule of 78's won't keep you from having the penalty assessed but will keep you from suffering an unpleasant surprise if you pay off early. Paying the penalty doesn't necessarily have to happen. There have been several cases of the rule being challenged successfully, based on the rationale that use of the rule constitutes a *hidden prepayment penalty* directly conflicting with other language in most contracts, which says there isn't any prepayment penalty. Last year, such a battle was won by the undersigned on exactly that basis against a bank that was, because of the Rule of 78's, demanding some $900 more in payoff than actually fairly owed for the time elapsed (4.6 years) on a 10-year loan.

In connection with that battle, the CoCo 2 played a major role, running a Rule of 78's amortization schedule and regular amortization schedules for comparisons the bank could not refute. The regular amortization schedule program used was the one by Bill Barden on Page 5 of his book, *TRS 80 Color Computer & MC-10 Programs*. The R-78 amortization program was an adaptation of Barden's program, needing only minor formula and heading changes. Combining the two programs was to have been a programming project, but Jack Eizenga's nifty program saves that effort. I wish I'd had it at the time! Thank you for featuring it and Jack for writing it. It is a valuable addition to the financial programs disk here at home.

I hope these comments help someone else disadvantageously involved or about to be involved with the Rule of 78's. The best way to avoid being penalized by it is to be sure it is not in your loan contract. Lenders are in the business of making money. If you are a decent financial risk, you can threaten to walk out on any new, to-be-signed contract with the Rule of 78's mentioned as applicable if you pay off early. Chances are good the lender will swiftly present another contract for your signature, one which doesn't call for the pesky R-78 and treats you fairly if you pay off early.

Bob Tatom
Mobile, AL

REVIEWING REVIEWS

Editor:

My thanks to Jerry Semones for his review of *GrafFind* in the April '88 issue. My only disappointment was his failure to mention the 39 digitized pictures that are included on the program disk. This is no small matter when picture disks are going for $10 to $20 for 20 or so pictures. Thank you again for a delightful review.

D. Steven Ricketts
President
Rainy Day Software
Boring, OR

HINTS AND TIPS

Editor:

In the January '88 issue of RAINBOW there appeared a hardware project titled "Child-Proofing the CoCo." This project made a keyboard-locking switch that would prevent children from messing up your programs.

I found that basically the same thing could be done with one simple poke. Just type `POKE &HFF0F,&HF0`.

That locks the keys so that nothing can be typed. To put everything back to normal, just press the reset button.

Glen Johnsrud
Lorette, Manitoba

Battling Cassette I/O Errors

Editor:

I am saving up for a disk drive. Until then, I am using my Realistic CTR-65 cassette recorder to store files. Lately I have been having a terrible time with I/O Errors. Here are some tips I have found to be helpful.

First, some I/O Errors can be "fixed" by unplugging the gray AUX plug when doing a `CLOAD`. Second, you want to unplug the black EAR plug when making `CSAVE`s. Why? On my machine, and most other recorders not specifically designed for computer use, the earphone jack is used as a monitor output when recording from radio or microphone. Apparently there isn't sufficient separation of the "mic" and "ear" circuits in the CoCo's cassette interface, and a small hum records on the tape along with the audio input from the CoCo as it records the program.

Terry F. Phillips, Sr.
Elkhart, IN

Clean Machine

Editor:

I read and enjoy every issue of THE RAINBOW, and I learn something from each one. I believe we are *all* beginners, never fully able to master our Color Computers. I was especially glad to see "A Glossary of Computer Terms" by Lee Veal in the January 1988 issue. I think this should have been in the magazine years ago. Even though I've had a CoCo for over six years, I am still learning. In fact, I learned that the "RS" in "RS-232" means "Recommended Standard," *not* "Radio Shack."

I have a hint on cleaning the CoCo's keyboard: Use a dry, skinny paint brush, like one that comes with paint-by-number sets, to remove dust, hair, etc., from between the keys. I also use one to clean the printer.

Also, use the following hint on the CoCo 3 to `CLOAD` or `CLOADM` programs from tape if you don't know the exact start. It saves entering `CLOAD` over and over. You don't need to specify the name of the program:

```
1 ON ERR GOTO 4
2 CLOAD(M)
3 END
4 RUN
```

Lee Deuell
Shell Rock, IA

Buyer Beware

Editor:

You won't find me on your subscription list. I have been buying your magazine every month at the local B. Dalton Booksellers since getting my first CoCo two years ago. I let my fingers do the walking through THE RAINBOW when I do my shopping.

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Spectrum Projects, an advertiser of yours, is selling a 512K CoCo 3 sticker for $4.99 plus a $3 shipping charge. You might think you're getting the metal "Tandy" plate, but what you actually get is roughly a 2½-by-⅜-inch adhesive foil tape with "512K CoCo" printed in tiny font with a black background. And no matter how careful you are, the black rubs off.

I can get these stickers printed locally for nine cents each. Plus, they [Spectrum] do general 4th Class mail, you know, "Some day delivery" for about 22 cents.

Also, I cannot see why Spectrum would market a fine product like *The Schematic Processor* with the original programmer's notes. Can't the folks at Spectrum type? It sure would make it seem like you're dealing with a respectable company.

If you don't choose to print this letter, I understand. But CoCo users should be aware of how much of a ripoff this really is.

Robert N. Carman II
Omaha, NE

We have received a number of complaints regarding Spectrum Projects. However, effective with the March '88 issue, Spectrum Projects no longer advertises its products in THE RAINBOW. And according to a letter some of our advertisers have received from Spectrum Projects, it is no longer doing business. Any complaints about this mail order business should be directed to: The Postmaster General, Howard Beach, NY 11414.

KUDOS

Editor:

I am just writing to compliment Dave Archer on his "Number Cruncher" *SUM128* program. I should have written in about some other programs long ago, as I have enjoyed many of them; this one I have modified, and it is very useful to me. I bought my first RAINBOW in January 1983 and subscribed to it a few months later. I also subscribed to RAINBOW ON TAPE until the disk version was available. Thanks for a great magazine. A Louisville RAINBOWfest sounds good, also.

Lyle Warner
Flint, MI

A Satisfied Customer

Editor:

I just wanted to tell you how delightful it has been dealing with one of your advertisers, S.D. Enterprises, and its flagship product, *VIP Writer III*. When I initially called with a multitude of questions, Paul Anderson at S.D.E. was very patient and spent a good deal of time on the phone answering all the questions I had. To top it off, when he heard of my disappointment with another CoCo 3 word processor, he offered me a $30 credit toward *VIP Writer III* if I sent in the one I didn't like with my order. To my knowledge, S.D.E. is extending this offer to others. Since my order arrived I have been in contact with Mr. Anderson with suggestions on how to improve *VIP Writer III*'s operation from a user's standpoint. Not only are the people at S.D.E. eager to listen to what the customer has to say, they are presently updating the program, incorporating some of these suggestions from myself and others. S.D. Enterprises is an excellent example of a good mail-order firm, which others would be wise to emulate.

Donald S. Ricketts
Boring, OR

Successful Operation

Editor:

I bought a monitor from one of your advertisers, Howard Medical, out of Chicago. I received the equipment in a week, but it did not work. I called the company, and they shipped me a replacement the next working day. It is the sort of excellent service that makes mail-order electronics possible and successful. Kudos to Howard Medical!

Dennis L. Wood
Indianapolis, IN

A Phonics Fan

Editor:

Thank you for Steve Blyn's phonics program in the March 1988 issue ("Fun With Phonics," Page 89). It is the ideal program for my use. I direct a tutorial program for over 100 at-risk elementary students. We

have three 16K CoCos and one 16K ECB CoCo. I have copied and adapted as many programs as I can find, but *Phonics* was one of the best.

Phonics is open-ended, so the tutor or student can determine when to terminate the exercise. It is short, so the amateur (myself) can type it in and save it to tape, identify an error and rectify it immediately, or easily change it from 16K ECB to just 16K by rewriting the sound line (Line 170).

One program like that each month would totally justify the expenditure for RAINBOW.

Ann Schwendener
Director, Tutorial Program
The Salvation Army
Kalamazoo, MI

Colorful Praise for RGB

Editor:

Your new advertiser, RGB Computer Systems, provides an exceptional product, a hard disk that is truly 100 percent BASIC-compatible, can be partitioned for OS-9 and runs on all CoCos.

In addition to producing an excellent product, the people at RGB are accessible, knowledgeable and generous with their help. What else? They send at least $150 worth of nonessential, but very helpful, utilities in the bargain.

If I were to provide a CoCo product, I would want it to be as good as RGB's hard disk system. With RGB, one gets more than what is expected.

Jim DeStafeno
Wyoming, DE

PEN PALS

• I am looking for pen pals anywhere in the U.S.A. I have a CoCo 2, double drives, DMP-105 printer and recorder. I will respond to all letters. I am 12 years old.

Chris Noles
2525 Quail Run
Marietta, GA 30060

• I am 19 years old and have a 64K ECB CoCo 1, new CoCo 3, disk drive, RS Speech Pak, Multi-Pak and a DMP-130A. I will answer *all* letters.

Nicholas Siclari
58 Vanderbilt Ave.
Staten Island, NY 10304

• I am 16 and have a CoCo 2, CCR-81 and a DMP-106. I also collect stamps. I write a lot of programs myself. I would like some pen pals my age.

David Hamby
1507 W. 17th
Hutchinson, KS 67501

• I have a CoCo 3, FD 501 and DMP-106, and would like to hear from anyone in the U.S.A. I like Adventures and programming in BASIC.

George Leal
P.O. Box 2232
Victoria, TX 77902

• I'm 10 years old and have a CoCo 3, a disk drive, a DMP-130 printer and a DCM-6 modem. I'm looking for a pen pal of any age. I will answer *all* letters.

Sam Newlands
130 Galiano St.
Royal Palm Beach, FL 33411

• I am a 15-year-old Boy Scout and am very interested in computers. I own a 128K Color Computer 3 and a CCR-81 cassette recorder. I like almost all types of games, especially golf games.

Jamie Stafford
4615 Rockcut Road
Norton, OH 44203

• Greetings! I have a 128K Color Computer 3 with one FD-501 drive, a DMP-105 printer, a DCM-5 auto modem, and green-screen monitor. I am 23 years old and have OS-9 Level I and BASIC09.

Eric Silnes
1317 Edgewood #1
Grafton, ND 58237

BULLETIN BOARD SYSTEMS

• There's a BBS in the Toronto area dedicated to the Color Computer. Remote Data Systems-09 has been in operation for almost two years. We have a large array of public domain software for downloading and have several knowledgeable users on such topics as OS-9. New users with new ideas are always welcome. Please call RDS-09 at (416) 283-7521. 2400/1200/300 bps, 8 data bits, no parity, 1 stop bit, 24 hours a day.

Doug V. Wright
291 Rouge Hills Dr.
Scarborough, Ontario
Canada M1C 2Z2

• The Portage Railroad Bulletin Board is open 24 hours a day at (814) 944-6588. It supports 300/1200/2400 baud. Settings should be 8 bits, full duplex, no parity. It is an IBM board, but we have a Color Computer SIGop in Conference #4.

William A. Smith
P.O. Box 101
Roaring Spring, PA 16673

• I am happy to announce that the Frisky CoCo BBS, which has been online for four years, has graduated from the 64K, three double-sided 40-track drives to a PC clone with a 62-Meg hard drive. There is a PC SIG and files, but the focus is still on Tandy's CoCo. Call (816) 436-2904, 7 days a week, 24 hours a day at 300, 1200 or 2400 baud.

Jerry Oliver, SysOp
The Frisky CoCo BBS
839 NW 69th Pl.
Kansas City, MO 64118

• I would like to let everyone know of three local BBSs in the area. First is The Rainbow's End, running at 300/1200 baud, which has five online games and plenty of downloads (public domain). Call (614) 446-7430. Online Friday through Sunday, 6 p.m. to midnight. The second is The Rabbit's Hole, running at 300 baud, online Monday through Friday, 2 p.m. to midnight. It has one online game and a few downloads (also public domain). Call (614) 367-0128. Last is CoCo Connections. It is a 300/1200 baud system with a few downloads. It is online Friday through Sunday, midnight to 6 a.m. Call (614) 446-1564.

Robert J. Grubb
Rt. 4, Box 309
Gallipolis, OH 45631

• Fast Trackin' BBS is *offline*. Please do not call its number as published in past issues of RAINBOW. It is now being operated by Jerry Downey in Hopkinsville, Kentucky, as the Midnite Express, (502) 885-4335. It runs 24 hours, 300/1200 baud 7E1. I hope to bring Fast Trackin' BBS back online someday.

David Guess
1292B Barnwood Court
Bowling Green, KY 42101

• My BBS runs on *CoBBS* modified to work under Stearman DOS. Some of the features include a faster running board, better error-trapping and machine language Xmodem upload and download routines. New users can reach the board at (615) 476-3340. It is running 24 hours a day at 300 and 1200 baud. Terminal parameters should be set at 8 bits, no parity, 1 stop bit (8N1).

Brian S. Graham
Rt. 2, Box 1036
Cleveland, TN 37311

• The Dungeon BBS of Newport, North Carolina, is now online at 300/1200/2400 baud, 24 hours a day. The board features games, Hi-Res graphics, multiple message bases, special interest groups, Shop and Swap, upload and download areas for CoCo, IBM, Apple, Commodore, Tandy and Atari computers, national network news and even a professional technical section. Call (919) 726-9737.

Chuck Katsekes
410 Scott Drive
Newport, NC 28570

• The Fine Art Treatise (FAT) BBS is running under *CoBBS* at 300/1200 baud, 24 hours. There are no fees, and a first-time caller has nearly full access. Featuring ASCII downloads, literature, crossbow, Never-Ending Story. Call (513) 778-9624.

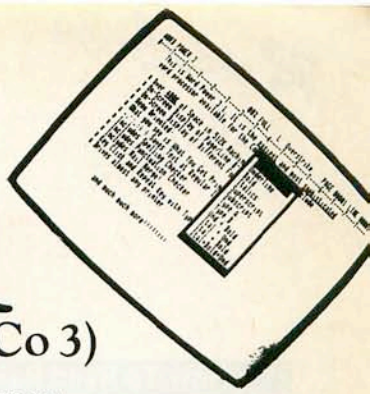
Jack Bowman
1010 Concord Ave.
Piqua, OH 45356

THE RAINBOW welcomes letters to the editor. Mail should be addressed to: Letters to Rainbow, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. Letters should include the writer's full name and address. Letters may be edited for purposes of clarity or to conserve space.

Letters to the editor may also be sent to us through our Delphi CoCo SIG. From the CoCo SIG> prompt, type RAI to take you into the Rainbow Magazine Services area of the SIG. At the RAINBOW> prompt, type LET to reach the LETTERS> prompt and then select Letters for Publication. Be sure to include your complete name and address.

Word Power 3.1

(The Ultimate Word Processor for the CoCo 3)



Power Unleashed! Unlike other word-processors, Word Power 3.1 is written from scratch for the CoCo 3. It bridges the gap between "what is" and "what should be" in word-processors. **No other word processor offers such a wide array of features that are so easy to learn and use.**

DISPLAY

The **80-column display** with true lowercase lets you view the full width of a standard page. **All prompts are displayed in plain English in neat colored windows (see display above).** The current column number, line number, page number and percentage of free memory is displayed on the screen at all times. The program even **displays the bottom margin perforation** so you know where one page ends and the other begins. You can also change foreground/background color of screen and select menu and carriage return colors to suit your needs! Carriage returns can be visible or invisible. Word Power 3.1 runs at double clock speed and can be used with RGB/composite/monochrome monitors as well as TV.

AVAILABLE MEMORY

No other word processor gives you so much memory. Word Power 3.1 gives you **over 72K** on a 128K machine and **over 450K** on a 512K machine to store text.

EDITING FEATURES

Word Power 3.1 has one of the **most powerful and user-friendly full-screen editors with word-wrap.** All you do is type. Word Power 3.1 takes care of the text arrangement. It even has a built-in **Auto-Save** feature which saves the current text to disk at regular intervals; so you know that your latest version is saved to disk. Here are some of the impressive editing features of Word Power 3.1:

Insert/Overstrike Mode (Cursor style changes to indicate mode); OOPS recall during delete; **Type-ahead buffer** for fast typers; Key-repeat (adjustable) and Key-click; Four-way cursor control and scrolling; Cursor to beginning of text, end of text, beginning of line, end of line, top/bottom of screen, next/previous word; Page up/down; Delete character, previous/next word, beginning/end of line, complete line, text before and after cursor; Locate/Replace with **wild-card search** with auto/manual replace; Block Mark, Unmark, Copy, Move and Delete; Line Positioning (Left/Center/Right); Set/Reset 120 programmable tab stops; Word count. Define left, right, top and bottom margins and page length. You can also highlight text (underline– with **on-screen underlining,** bold, italics, superscripts, etc). Word Power 3.1 even has a **HELP screen** which can be accessed any time during edit.

MAIL-MERGE

Ever try mailing out the same letter to 50 different people or sending out several resumes? Could be quite a chore. Not with Word Power 3.1. Using this feature, you can type a letter, follow it with a list of addresses and have Word Power 3.1 print out personalized letters. It's that easy!

SAVING/LOADING TEXT

Word Power 3.1 creates ASCII format files which are compatible with almost all terminal, spell-checking and other word-processing programs. It allows you to load, save, append and kill files and also to create and edit Basic, Pascal, C and Assembly files. You can select files by simply cursoring through the disk directory. Supports double-sided drives and various step rates.

PRINTING

Word Power 3.1 drives almost any printer (DMP series, EPSON, GEMINI, OKIDATA, etc). Allows print options such as baud rates, line spacing, page pause, partial print, page numbers, page number placement, linefeed option, multi-line headers/footers, right justification and number of copies (see display above). The values for these parameters and the margins can be changed anytime in the text by embedding Printer Option Codes. Word Power 3.1 has the **WHAT YOU SEE IS WHAT YOU GET** feature which allows you to preview the text on the screen as it will appear in print. You can see margins, page breaks, justification and more.

SPELLING CHECKER

Word Power 3.1 comes with a 50,000 word spelling checker/dictionary which finds and corrects mistakes within your text. You can add words to or delete from the dictionary or create a dictionary of your own.

PUNCTUATION CHECKER

This checker will **proofread your text for punctuation errors** such as capitalization, spaces after periods/commas, double words and much more. It's the perfect addition to any word processor.

DOCUMENTATION

Writing with Word Power 3.1 is a breeze. Word Power 3.1 comes with a well-written, easy-to-comprehend instruction manual which will lead you step-by-step through the program.

Word Power 3.1 comes on an UNPROTECTED disk and is compatible with RS DOS 1.0/1.1 and ADOS. Only $79.95.

(Word Power 3 owners can get the 3.1 version by sending proof of purchase and $10.00 to cover the cost of shipping and the manual.)

MICROCOM SOFTWARE
P.O. Box 214
Fairport, NY 14450
Phone (716) 223-1477

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How To Read Rainbow

When we use the term CoCo, we refer to an affectionate name that was first given to the Tandy Color Computer by its many fans, users and owners.

The BASIC program listings printed in THE RAINBOW are formatted for a 32-character screen — so they show up just as they do on your CoCo screen. One easy way to check on the accuracy of your typing is to compare what character "goes under" what. If the characters match — and your line endings come out the same — you have a pretty good way of knowing that your typing is accurate.

We also have "key boxes" to show you the *minimum* system a program needs. But, *do* read the text before you start typing.

Finally, the little disk and/or cassette symbols on the table of contents and at the beginning of articles indicate that the program is available through our RAINBOW ON DISK or RAINBOW ON TAPE service.

Using Machine Language

The easiest way to "put" a machine language program into memory is to use an editor/assembler, a program you can purchase from a number of sources. All you have to do, essentially, is copy the relevant instructions from THE RAINBOW's listing into CoCo.

Another method of putting an ML listing into CoCo is called "hand assembly" — assembly by hand, which *sometimes* causes problems with ORIGIN or EQUATE statements. You ought to know something about assembly to try this.

Use the following program if you want to hand-assemble ML listings:

```
10 CLEAR200,&H3F00:I=&H3F80
20 PRINT "ADDRESS:";HEX$(I);
30 INPUT "BYTE";B$
40 POKE I, VAL("&H"+B$)
50 I=I+1:GOTO 20
```

This program assumes you have a 16K CoCo. If you have 32K, change the &H3F00 in Line 10 to &H7F00 and change the value of I to &H7F80.

OS-9 and RAINBOW ON DISK

The OS-9 side of RAINBOW ON DISK contains two directories: CMDS and SOURCE. It also contains a file, `read.me.first`, which explains the division of the two directories. The CMDS directory contains executable programs and the SOURCE directory contains the ASCII source code for these programs. BASIC09 programs will only be offered in source form so they will only be found in the SOURCE directory.

OS-9 is a very powerful operating system. Because of this, it is not easy to learn at first. However, while we can give specific instructions for using the OS-9 programs, you will find that the OS-9 programs will be of little use unless you are familiar with the operating system. For this reason, if you haven't "learned" OS-9 or are not comfortable with it, we suggest you read *The Complete Rainbow Guide to OS-9* by Dale Puckett and Peter Dibble.

The following is not intended as a course in OS-9. It merely states how to get the OS-9 programs from RAINBOW ON DISK to your OS-9 system disk. Use the procedures appropriate for your system. Before doing so, however, boot the OS-9 operating system according to the documentation from Radio Shack.

1) Type `load dir list copy` and press ENTER.
2) If you have only one disk drive, remove the OS-9 system disk from Drive 0 and replace it with the OS-9 side of RAINBOW ON DISK. Then type `chd/d0` and press ENTER. If you have two disk drives, leave the sytem master in Drive 0 and put the RAINBOW ON DISK in Drive 1. Then type `chd/d1` and press ENTER.
3) List the `read.me.first` file to the screen by typing `list read.me.first` and pressing ENTER.
4) Entering `dir` will give you a directory of the OS-9 side of RAINBOW ON DISK. To see what programs are in the CMDS directory, enter `dir cmds`. Follow a similar method to see what source files are in the SOURCE directory.
5) When you find a program you want to use, copy it to the CMDS directory on your system disk with one of the following commands:

One-drive system: `copy /d0/cmds/` *filename* `/d0/cmds/` *filename* `-s`

The system will prompt you to alternately place the source disk (RAINBOW ON DISK) or the destination disk (system disk) in Drive 0.

Two-drive system: `copy /d1/cmds/` *filename* `/d0/cmds/` *filename*

Once you have copied the program, you execute it from your system master by placing that disk in Drive 0 and entering the name of the file.

The Rainbow Seal

RAINBOW CERTIFICATION SEAL

The Rainbow Certification Seal is our way of helping you, the consumer. The purpose of the Seal is to certify to you that any product that carries the Seal has actually been seen by us, that it does, indeed, exist and that we have a sample copy here at THE RAINBOW.

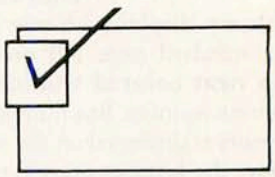
Manufacturers of products — hardware, software and firmware — are encouraged by us to submit their products to THE RAINBOW for certification.

The Seal is not a "guarantee of satisfaction." The certification process is different from the review process. You are encouraged to read our reviews to determine whether the product is right for your needs.

There is absolutely no relationship between advertising in THE RAINBOW and the certification process. Certification is open and available to any product pertaining to CoCo. A Seal will be awarded to *any* commercial product, regardless of whether the firm advertises or not.

We will appreciate knowing of instances of violation of Seal use.

Rainbow Check Plus



The small box accompanying a program listing in THE RAINBOW is a "check sum" system, which is designed to help you type in programs accurately.

Rainbow Check PLUS counts the number and values of characters you type in. You can then compare the number you get to those printed in THE RAINBOW. On longer programs, some benchmark lines are given. When you reach the end of one of those lines with your typing, simply check to see if the numbers match.

To use *Rainbow Check PLUS*, type in the program and save it for later use, then type in the command RUN and press ENTER. Once the program has run, type NEW and press ENTER to remove it from the area where the program you're typing in will go.

Now, while keying in a listing from THE RAINBOW, whenever you press the down arrow key, your CoCo gives the check sum based on the length and content of the program in memory. This is to check against the numbers printed in THE RAINBOW. If your number is different, check the listing carefully to be sure you typed in the correct BASIC program code. For more details on this helpful utility, refer to H. Allen Curtis' article on Page 21 of the February 1984 RAINBOW.

Since *Rainbow Check PLUS* counts spaces and punctuation, be sure to type in the listing exactly the way it's given in the magazine.

```
10 CLS:X=256*PEEK(35)+178
20 CLEAR 25,X-1
30 X=256*PEEK (35)+178
40 FOR Z=X TO X+77
50 READ Y:W=W+Y:PRINT Z,Y;W
60 POKE Z,Y:NEXT
70 IFW=7985THEN80ELSEPRINT
   "DATA ERROR":STOP
80 EXEC X:END
90 DATA 182, 1, 106, 167, 140, 60, 134
100 DATA 126, 183, 1, 106, 190, 1, 107
110 DATA 175, 140, 50, 48, 140, 4, 191
120 DATA 1, 107, 57, 129, 10, 38, 38
130 DATA 52, 22, 79, 158, 25, 230, 129
140 DATA 39, 12, 171, 128, 171, 128
150 DATA 230, 132, 38, 250, 48, 1, 32
160 DATA 240, 183, 2, 222, 48, 140, 14
170 DATA 159, 166, 166, 132, 28, 254
180 DATA 189, 173, 198, 53, 22, 126, 0
190 DATA 0, 135, 255, 134, 40, 55
200 DATA 51, 52, 41, 0
```

COCO 3 UTILITIES GALORE

(All utilities support 40/80 columns for CoCo 3)
(CoCo 2 versions are available for most utilities)

SUPER TAPE/DISK TRANSFER

● Disk-to-Disk Copy (1-3 passes) ● Tape-to-Disk Copy ● Tape-to-Disk Automatic Relocate ● Disk-to-Tape Copy ● Tape-to-Tape Copy
Copies Basic/ML programs and DATA files. CoCo 1, 2 & 3. 32K Disk System (Disk to Disk Copy requires 64K). Disk Only **$24.95**

OS9 LEVEL II RAMDISK

Lightning Fast Ramdisk with Auto Formatting. A must for any OS9 Level II User. Req. 512K **$29.95.** (Only $14.95 with the purchase of 512K Upgrade & Ramdisk!!).

HI-RES JOYSTICK SOFTWARE

Wish you could use the hi-res joystick interface from Basic? You can now. This program will let you access 640 x 640 pixels from your joystick for extra precision. CoCo 3 Disk **$14.95**

COCO NEWSROOM

Now available for the CoCo III! You can design your own newspaper with Banner Headlines/6 articles using sophisticated Graphics, Fonts and Fill Patterns. Comes with 22 fonts & 50 pictures! Over 140K of code. Disk only **$49.95**

MAILLIST PRO

The ultimate mailing list program. Allows you to add, edit, view, delete, change, sort (by zipcode or name) and print labels. Its indispensible! Disk Only **$19.95** (CoCo 2 version included)

DISK LABEL MAKER

Allows you to design professional disk labels! Allows elongated, normal and condensed format for text, double-strike, border creation and multiple-label printing. Its a MUST for any user with a disk drive. Disk Only **$19.95.** Supports DMP 105/110/120/130/430, GEMINI, STAR, EPSON and compatibles. (CoCo 2 version included)

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Why bother with balancing your checkbook? Let the CoCo do it for you! Allows you to add, view, search, edit, change, delete and printout (in a table or individual entry format) checkbook entries. Updates balance after each entry. Allows files for checking, saving and other accounts. Disk Only **$19.95** (CoCo 2 version included)

BOWLING SCORE KEEPER

An excellent utility to keep track of your bowling scores. Allows you to save scores under individuals or teams. You can edit, change, delete and compare scores. A must for anyone who wants to keep track of his or her bowling performance. Disk **$19.95** (CoCo 2 version included).

VCR TAPE ORGANIZER

Organize your videocassettes with this program! Allows you to index cassettes by title, rating, type, play time and comments. Also allows you to sort titles alphabetically and view/print selected tapes. If you own a VCR, this program is a must. Disk Only **$19.95** (CoCo 2 version included).

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NEW

32, 40, 80 column text dump, PMODE 4 Graphics Dump. Single Keystroke Operation allows you to take snapshots of screens even when programs are running! Works on DMP's, Epson and Gemini. CoCo 1, 2 and 3. Disk Only **$24.95**

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Let the CoCo keep track of your bills. Allows you to enter bills under various categories and reminds you when they are due. Disk Only. **$19.95**

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Generate monthly calendars on your printer for any year in the 20th century. Disk Only. **$19.95**

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(Latest Version): Transfer CoCo Disk files to IBM compatible computer. Transfer MS-DOS files to CoCo. Req. 2-Drive IBM compatible. **$39.95**

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Makes a BACKUP of ANY disk. **$32.95**

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Advanced Disk Operating System for CoCo 3. **$34.95 ADOS $27.95**

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Displays most games in color on RGB monitors. For CoCo 3 Disk. **$24.95**

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OS 9 LEVEL II OPERATING SYSTEM

NEW

Supports 512K RAM dual speed, multi-tasking, multiple windows and more! Comes with disk and complete documentation. Only **$89.95**

MULTI-VUE

User friendly graphics interface with multiple "window" applications for Level II. Only **$54.95**

WIZ

OS9 Level II Terminal Package with 300-19200 baud rate and windowing capability. Requires 512K and RS-232 Pack. Only **$79.95**

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Best OS9 Word Processor. Implements WordStar (R) editing capabilities. Even has a built in spelling checker. Use with OS-9 Text Formater to get beautiful printouts. For OS9 Level 1 and 2. Disk Only **$49.95. OS-9 Text Formatter: Printout beautiful documents from any ASCII file. Only $34.95. Both Screen Star and OS-9 Text Formatter: $74.95**

DATA MASTER

Excellent database for OS9. Features include: windows, pull down menus, sorting, etc. Requires OS9 Level II & 512K. Only **$64.95**

PC-Xfer UTILITIES

NEW

Programs to format and transfer files to/from MS-DOS diskettes on CoCo Under OS9 Level 1 or 2. Requires SDISK or SDISK3. Only **$44.95**

SDISK 3

NEW

Standard disk drive module replacement allows full use of 40/80 track double sided drives. Req. OS9 Level II. Only **$29.95**

SDISK

NEW

Same as SDISK 3 except for OS9 Level I. Only **$29.95**

OS9 LEVEL II RAMDISK

$29.95

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The CoCo vs. CoCo Controversy

The most often-received letters we get here at THE RAINBOW concern what I have decided to dub the CoCo vs. CoCo Controversy (CCC, but *not* the Civilian Conservation Corps — youngsters, read your American history textbooks).

Indeed, we get a lot of letters from people who say that we devote too much space to the CoCo 3 and not enough to the CoCo 1 and 2. Interestingly, we also get a lot of letters (something like the same number by my count) from people who say we devote too many pages to CoCo 1 and 2 and not enough to CoCo 3.

Every once in a while, one member of the editorial corps walks into my office or corners me at the Pepsi machine and allows how he or she is concerned about this letter or that. Ideas of all sorts have been advanced.

I'm not too worried, and here's why.

Back in what my children consider the dawn of recorded history (something like about the time Cro-Magnon Man was taking over from the Neanderthals, when I was young) I worked for United Press International, running the state news operation in Alabama during a particularly intense Democratic gubernatorial primary year.

There were people running from out of the woodwork all over, but the two big candidates were the incumbent, Albert Brewer, and former Gov. George Wallace — who were really slugging it out. The race had some national political implications, since Wallace (this was before the attempt on his life that left him confined to a wheelchair) was certain to run for president again if he was elected to another term as governor.

About a dozen other candidates were in the field, but Alabama has a runoff rule — the top two vote-getters go head-to-head in a second primary a few weeks later if no one gets a majority in the first election.

So, it was really a Brewer-Wallace race. Everyone knew it except, of course, some of the more obscure "other" candidates.

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We did individual stories on the three or four leading candidates twice a day (once for morning and once for afternoon newspapers) and updates almost hourly for broadcast stations. We also did one roundup story that tried to incorporate all the "doings" of the day for all the candidates.

It was, I recall, about six weeks before the first primary that I started to get telephone calls. Interestingly, both the Wallace camp and the Brewer camp started calling at the same time; and both had essentially the same thing to say. That was, "We've been reading these stories in the paper here and we see that you're giving more attention to the other guy." One of the sides — I won't tell you which — even added inches of copy over a week's period and found that the opponent had five inches more "coverage" than his candidate.

I admit I was a little flustered. These calls were coming every other day or so, and I knew we were trying to be fair and balanced. Finally, I put in a call to my division news manager in Atlanta, asking for his opinion.

"Both sides are complaining," he said. "That's good. It means you're doing what you should be doing — balancing things out. If one side was complaining and the other side was quiet, then I'd think that, maybe, the side that was complaining might have something to complain about."

"Both sides are complaining," he said. "That's good. It means you're doing what you should be doing — balancing things out."

He added, of course, that they were reading all our stories in Atlanta, too, and re-sending them for the national news report. Had they "detected bias," there was little question we would have already heard about it.

It was a good lesson for me to learn, and I've honestly applied it ever since. When people here ask me about the CCC, I tell 'em the story.

I do think we are doing a good job in providing support for all the CoCos, no matter which one you have. Yes, I look through the issues to see if there is any indication of slighting one or the other. I don't really see it.

Of course, we are dependent on your sending us submissions for programs to include in THE RAINBOW. So, if you want to enhance coverage of a specific Color Computer, send us something we can use.

No, I do not think this will still the CCC. But I hope it offers some insight.

— Lonnie Falk

One-Liner Contest Winner . . .

This short verification program is used after initializing a new disk to verify that all sectors are intact. You can also check older disks that have programs stored on them. After running this one-liner, enter the desired track you want to start reading a disk from. If a "bad" sector is encountered, an I/O Error is given along with the offending sector number.

The listing:

```
1 CLEAR4ØØ:CLS:PRINT"DISK VERIFY
 1.Ø",,"(C) 1985 BRUCE K. BELL",
,,:PRINT"INSERT TARGET DISK.":IN
PUT"BEGIN WITH TRACK #";Q:FORT=Q
 TO34:PRINT@96,"TRACK="T:FORS=1T
O18:PRINT@128,"SECTOR="S:DSKI$Ø,
T,S,A$,B$:NEXTS,T:PRINT:PRINT"DI
SK IS GOOD!":CLEAR2ØØ:END
```

Bruce K. Bell
Rockmart, GA

(For this winning one-liner contest entry, the author has been sent copies of both *The Third Rainbow Book of Adventures* and its companion *The Third Rainbow Adventures Tape.*)

One-Liner Contest Winner . . .

This one-liner will graph any function passed to it from within the program. Just change Y=SIN(X) to any other form of *y=x*. If you don't want the graphics to vanish upon completion, add another line. Also, to use longer equations (such as *y=sin(x)+cos(x)+x*x/35+abs(x-10)+10)*, divide the program into more lines.

The listing:

```
1Ø Q=6.28:PMODE4,1:PCLS:SCREEN1,
1:DRAW"BM96,ØM96,192BMØ,96M192,9
6BMØ,96":FORX=-Q TOQ STEP(2*Q)/1
92:E=INT((X+Q)*192/(2*Q)):Y=SIN(
X):F=INT((-1*Y+Q)*192/(2*Q)):IFF
>192THENLINE-(E,192),PSET:NEXTEL
SEIFF<ØTHENLINE-(E,Ø),PSET:NEXTE
LSELINE-(E,F),PSET:NEXT
```

Paul Keller
Wayne, PA

(For this winning one-liner contest entry, the author has been sent copies of both *The Third Rainbow Book of Adventures* and its companion *The Third Rainbow Adventures Tape.*)

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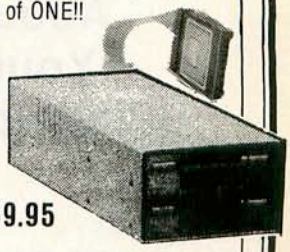
Double Sided Double Density 360K 40 Track ½ Ht Disk Drives for CoCo 2 and 3. Buy from someone else and all you get is a disk drive. Buy from us and not only do you get a quality disk drive but also $60 worth of disk utility software (Super Tape/Disk Transfer and Disk Tutorial) and our DISKMAX utility which allows you to use BOTH sides of our disk drives. Its like buying TWO disk drives for the price of ONE!!



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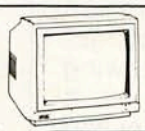

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SERIAL TO PARALLEL INTERFACE: With 6 switch selectable baud rates (300-9600) Comes with all cables. **$44.95**

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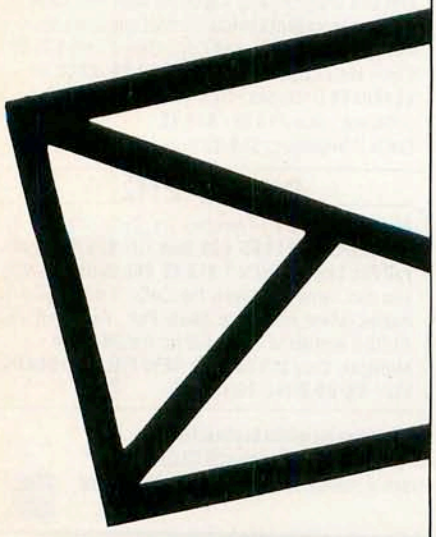

The Best Is Yet to Come

Time is a precious commodity in this pressurized, deadline-intensive world of magazine publishing. Emphasis is often placed on the next day, rather than the next issue. However, John Crawley's appointment as editorial director of Falsoft has relieved me of my duties as production coordinator, and as a result, I am free to devote even more of my attention to improving THE RAINBOW and implementing many of the excellent ideas and suggestions that have come my way since taking over as managing editor. Here is just a sampling of what you can expect in the months ahead:

- Fewer articles and programs devoted to the monthly thematic schedule, allowing more space for at least one game, graphics, music, utility and educational program in each issue

- An entertainment column, featuring CoCo-generated puzzles, contests, etc.

- More assembly and machine language programming and tutorials

- More technical information on the CoCo 3 (e.g., memory maps, bugs, patches and fixes, etc.)

- More OS-9 programs and tutorials

- Programming and uses for the Radio Shack Appliance and Light Controller

- Tutorials on drawing Hi-Res graphics pictures

- A cross-reference to the many various printers, detailing different printer codes, what they represent, and how to change them to suit different brands of printers

- A question-and-answer column to help readers with specific BASIC programming problems

Although plans are only at the preliminary stage, I'll be discussing these topics and many others with writers and programmers in the CoCo Community this month at RAINBOWfest-Chicago. Hope to see you there!

— Jutta Kapfhammer

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The CoCo Gallery

1st

COCO 3

Coyote
Wally Mayes

This breathtaking view from the western prairies of North America was created with *CoCo Max III*. Wally, a machinist by trade, lives in Hamilton, Ohio, and has many hobbies, including archery, horseshoes and leather tooling.

2nd

Rainy Day
James A. Upperman

James, of Amlin, Ohio, used CoCo 3 BASIC and a utility he is developing to create this distinct illustration.

SHOWCASE YOUR BEST! You are invited to nominate original work for inclusion in upcoming showings of "CoCo Gallery." Share your creations with the CoCo Community! Be sure to send a cover letter with your name, address and phone number, detailing how you created your picture (what programs you used, etc.) and how to display it. Also, please include a few facts about yourself.

Don't send us anything owned by someone else; this means no game screens, digitized images from TV programs or material that's already been submitted elsewhere. A digitized copy of a picture that appears in a book or magazine is *not* an original work.

We will award two first prizes of $25, one for the CoCo 3 and one for the CoCo 1 and 2; one second prize of $15 and one third prize of $10. Honorable Mentions may also be given.

Please send your entry on either tape or disk to the CoCo Gallery, THE RAINBOW, P.O. Box 385, Prospect, KY 40059. Remember, this is a contest and your entry will not be returned.

— Angela Kapfhammer, Curator

We are taking "CoCo Gallery" to RAINBOWfest Chicago!
See Page 49 for details.

3rd

Hyper-Flight
Keith Schuler

The CoCo 3 and *CoCo Canvas*, a program Keith wrote, were used to create this depiction. He is 15 years old, races model cars and enjoys the CoCo 3.

HONORABLE MENTION

Rainbowloon
Logan Ward

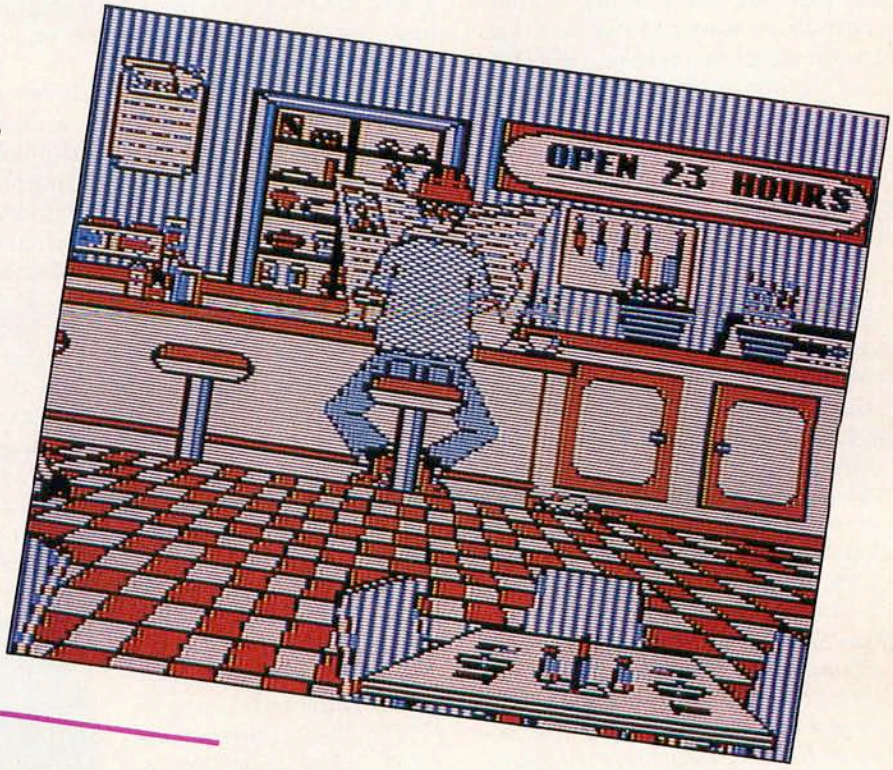
Logan, of Memphis, Tennessee, used *Color Max 3* to develop this variegated scene.

1st

COCO 1 & 2

The Diner
Barry O'Brien

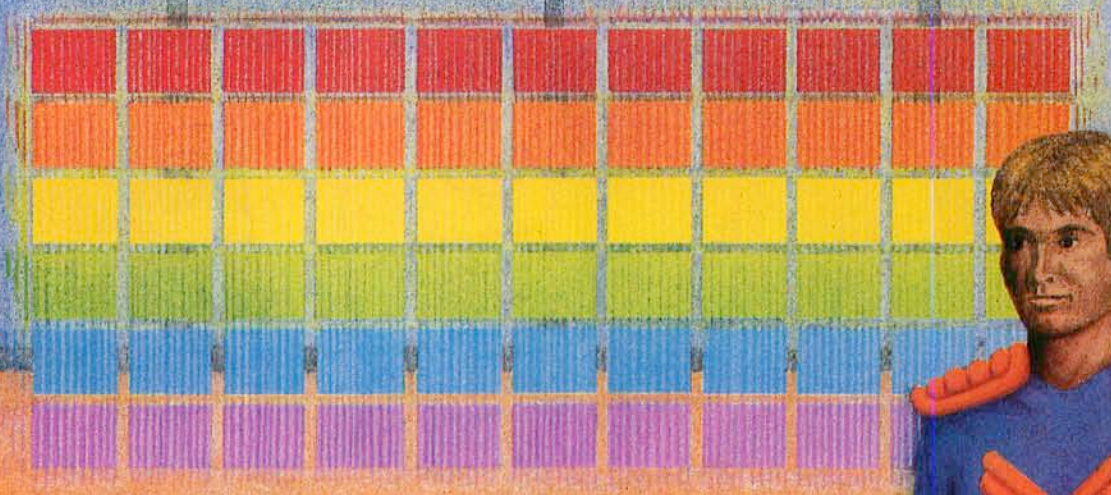
Barry, of St. Johns, Newfoundland, used *CoCo Max II* to illustrate this graphic. He is a self-taught programmer who enjoys sports and solving Adventure games.

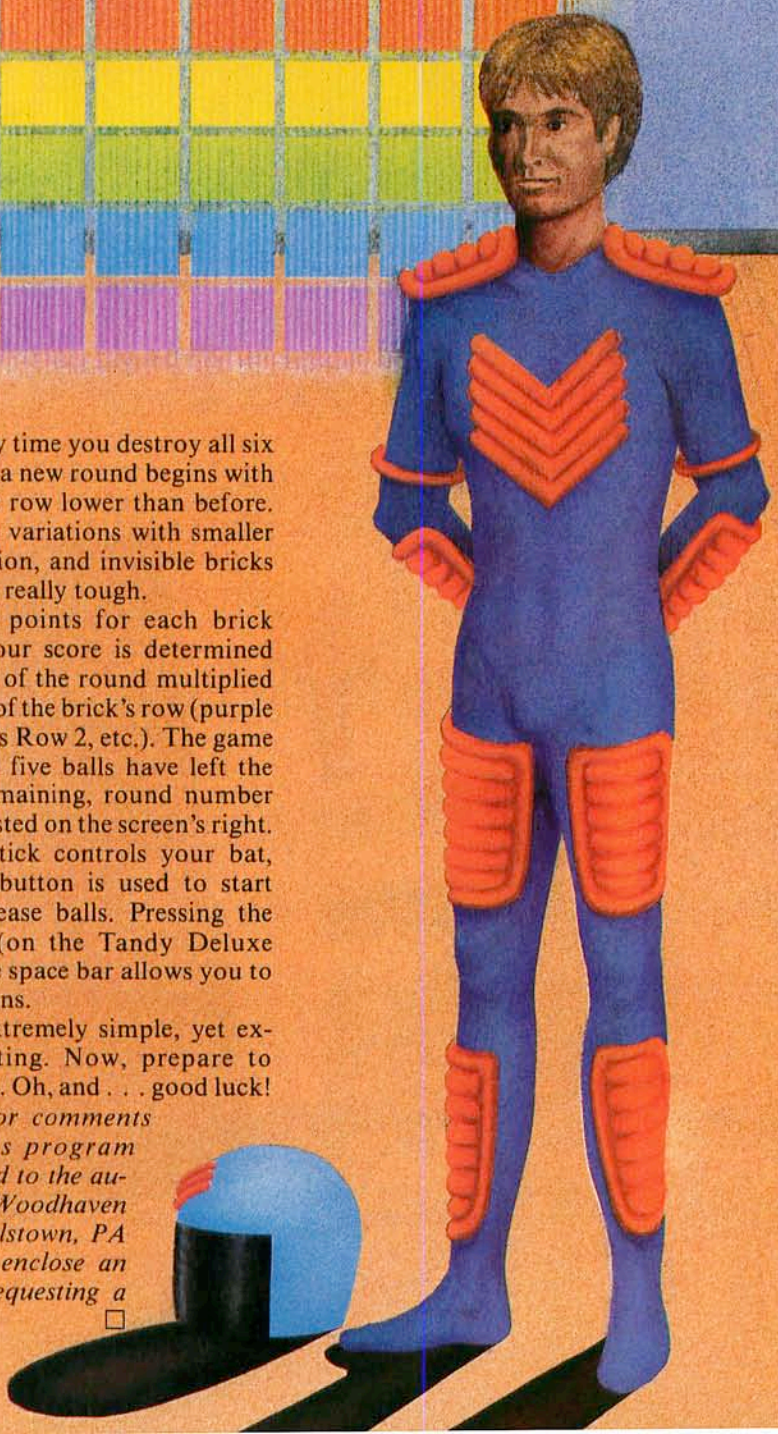


A fast-paced action game . . .

STRATA

By Michael T. Sirolly





Greetings, and welcome to the colorful courts of *Strata*! You are about to take part in a challenging and elegant game of wall-bashing, an integral part of our long and rich heritage.

First, however, it might be helpful for you to become acquainted with the deceptively simple rules to our entertaining diversion. A ball will be introduced onto the court. This ball bounces off walls and destroys colored bricks on contact. If you play our rebound variation, the ball will be deflected by the bricks; otherwise, it will proceed straight through the wall. The court is open at the bottom; your goal is to keep the ball in play by rebounding it off the bat you control.

To further complicate matters, this bat, located near the exit, decreases in size should the ball reach the court's upper wall. Also, the ball's velocity increases whenever it comes into contact with one of the upper three layers of bricks. Every time you destroy all six rows of bricks, a new round begins with a new wall one row lower than before. There are even variations with smaller bats, faster action, and invisible bricks to make things really tough.

You receive points for each brick demolished. Your score is determined by the number of the round multiplied by the number of the brick's row (purple is Row 1, blue is Row 2, etc.). The game continues until five balls have left the court. Balls remaining, round number and score are listed on the screen's right. The right joystick controls your bat, while the red button is used to start games and release balls. Pressing the black button (on the Tandy Deluxe Joystick) or the space bar allows you to choose variations.

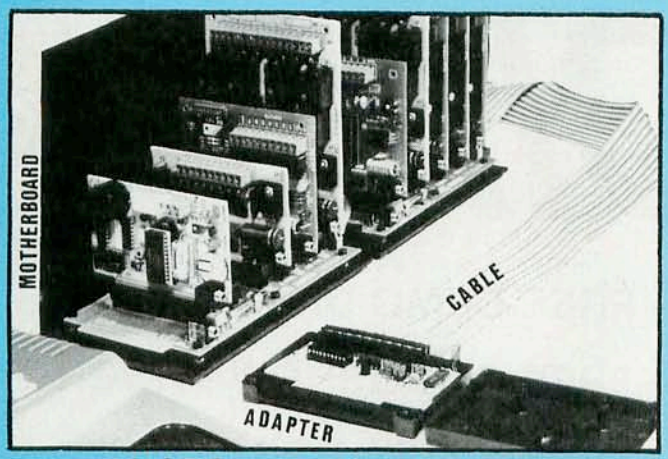
That's it! Extremely simple, yet extremely addicting. Now, prepare to enter the courts. Oh, and . . . good luck!

(Questions or comments regarding this program may be directed to the author at 1514 Woodhaven Drive, Hummelstown, PA 17036. Please enclose an SASE when requesting a reply.) □

Michael Sirolly recently laid to rest his six-year-old gray CoCo in favor of the sleeker CoCo 3. During infrequent but well-deserved breaks, he enjoys participating in drama, choral and instrumental groups.

The Amazing A-BUS

NEW



An A-BUS system with two Motherboards A-BUS adapter in foreground

The A-BUS system works with the original CoCo, the CoCo 2 and the CoCo 3.

Plug into the future

With the A-BUS you can plug your PC (IBM, Apple, TRS-80) into a future of exciting new applications in the fields of control, monitoring, automation, sensing, robotics, etc.

Alpha's modular A-BUS offers a proven method to build your "custom" system today. Tomorrow, when you are ready to take another step, you will be able to add more functions. This is ideal for first time experimenting and teaching.

A-BUS control can be entirely done in simple BASIC or Pascal, and no knowledge of electronics is *required!*

An A-BUS system consists of the A-BUS adapter plugged into your computer and a cable to connect the Adapter to 1 or 2 A-BUS cards. The same cable will also fit an A-BUS Motherboard for expansion up to 25 cards in any combination.

The A-BUS is backed by Alpha's continuing support (our 11th year, 50000 customers in over 60 countries).

The complete set of A-BUS User's Manuals is available for $10.

About the A-BUS system:

- All the A-BUS cards are very easy to use with any language that can read or write to a Port or Memory. In BASIC, use INP and OUT (or PEEK and POKE with Apples and Tandy Color Computers)
- They are all compatible with each other. You can mix and match up to 25 cards to fit your application. Card addresses are easily set with jumpers.
- A-BUS cards are shipped with power supplies (except PD-123) and detailed manuals (including schematics and programming examples).

Relay Card — RE-140: $129

Includes eight industrial relays, (3 amp contacts, SPST) individually controlled and latched. 8 LED's show status. Easy to use (OUT or POKE in BASIC). Card address is jumper selectable.

Reed Relay Card — RE-156: $99

Same features as above, but uses 8 Reed Relays to switch low level signals (20mA max). Use as a channel selector, solid state relay driver, etc.

Analog Input Card — AD-142: $129

Eight analog inputs. 0 to +5V range can be expanded to 100V by adding a resistor. 8 bit resolution (20mV). Conversion time 120us. Perfect to measure voltage, temperature, light levels, pressure, etc. Very easy to use.

12 Bit A/D Converter — AN-146: $139

This analog to digital converter is accurate to .025%. Input range is −4V to +4V. Resolution: 1 millivolt. The on board amplifier boosts signals up to 50 times to read microvolts. Conversion time is 130ms. Ideal for thermocouple, strain gauge, etc. 1 channel. (Expand to 8 channels using the RE-156 card).

Digital Input Card — IN-141: $59

The eight inputs are optically isolated, so it's safe and easy to connect any "on/off" devices, such as switches, thermostats, alarm loops, etc. to your computer. To read the eight inputs, simply use BASIC INP (or PEEK).

24 Line TTL I/O — DG-148: $65

Connect 24 input or output signals (switches or any TTL device) to your computer. The card can be set for: input, latched output, strobed output, strobed input, and/or bidirectional strobed I/O. Uses the 8255A chip.

Clock with Alarm — CL-144: $89

Powerful clock/calendar with: battery backup for Time, Date and Alarm setting (time and date); built in alarm relay, led and buzzer; timing to 1/100 second. Easy to use decimal format. Lithium battery included.

Touch Tone® Decoder — PH-145: $79

Each tone is converted into a number which is stored on the board. Simply read the number with INP or POKE. Use for remote control projects, etc.

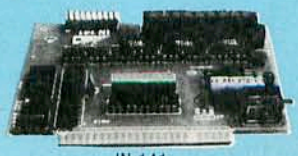
A-BUS Prototyping Card — PR-152: $15

3½ by 4½ in. with power and ground bus. Fits up to 10 I.C.s

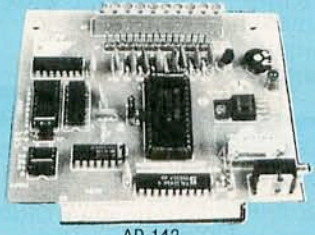
ST-143

CL-144

RE-140



IN-141



AD-142

Smart Stepper Controller — SC-149: $299

World's finest stepper controller. On board microprocessor controls 4 motors simultaneously. Incredibly, it accepts plain English commands like "Move arm 10.2 inches left". Many complex sequences can be defined as "macros" and stored in the on board memory. For each axis, you can control: coordinate (relative or absolute), ramping, speed, step type (half, full, wave), scale factor, units, holding power, etc. Many inputs: 8 limit & "wait until" switches, panic button, etc. On the fly reporting of position, speed, etc. On board drivers (350mA) for small steppers (MO-103). Send for SC-149 flyer.

Remote Control Keypad Option — RC-121: $49
To control the 4 motors directly, and "teach" sequences of motions.

Power Driver Board Option — PD-123: $89
Boost controller drive to 5 amps per phase. For two motors (eight drivers).

Breakout Board Option — BB-122: $19
For easy connection of 2 motors. 3 ft. cable ends with screw terminal board.

Stepper Motor Driver — ST-143: $79

Stepper motors are the ultimate in motion control. The special package (below) includes everything you need to get familiar with them. Each card drives two stepper motors (12V, bidirectional, 4 phase, 350mA per phase).

Special Package: 2 motors (MO-103) + ST-143: **PA-181: $99**

Stepper Motors — MO-103: $15 or 4 for $39

Pancake type, 2¼" dia, ¼" shaft, 7.5°/step, 4 phase bidirectional, 300 step/sec, 12V, 36 ohm, bipolar, 5 oz-in torque, same as Airpax K82701-P2.

Current Developments

Intelligent Voice Synthesizer, 14 Bit Analog to Digital converter, 4 Channel Digital to Analog converter, Counter Timer, Voice Recognition.

A-BUS Adapters for:

IBM PC, XT, AT and compatibles. Uses one short slot.	AR-133...$69
Tandy 1000, 1000 EX & SX, 1200, 3000. Uses one short slot.	AR-133...$69
Apple II, II+, IIe. Uses any slot.	AR-134...$49
TRS-80 Model 102, 200 Plugs into 40 pin "system bus"	AR-136...$69
Model 100. Uses 40 pin socket. (Socket is duplicated on adapter).	AR-135...$69
TRS-80 Mod 3,4,4 D. Fits 50 pin bus. (With hard disk, use Y-cable).	AR-132...$49
TRS-80 Model 4P. Includes extra cable. (50 pin bus is recessed).	AR-137...$62
TRS-80 Model I. Plugs into 40 pin I/O bus on KB or E/I.	AR-131...$39
Color Computers (Tandy). Fits ROM slot. Multipak, or Y-cable.	AR-138...$49

A-BUS Cable (3 ft, 50 cond.) — CA-163: $24

Connects the A-BUS adapter to one A-BUS card or to first Motherboard.

Special cable for two A-BUS cards: CA-162: $34

A-BUS Motherboard — MB-120: $99

Each Motherboard holds five A-BUS cards. A sixth connector allows a second Motherboard to be added to the first (with connecting cable CA-161: $12). Up to five Motherboards can be joined this way to a single A-BUS adapter. Sturdy aluminum frame and card guides included.

- The A-BUS is not a replacement for the Multi-pak

Add $3.00 per order for shipping.
Visa, MC, checks, M.O. welcome.
CT & NY residents add sales tax.
C.O.D. add $3.00 extra.
Canada: shipping is $5
Overseas add 10%

ALPHA Products
a Sigma Industries Company
242-W West Avenue, Darien, CT 06820

Technical info: **(203) 656-1806**
Orders only (Except in CT) **800 221-0916**
Connecticut orders: **(203) 348-9436**
All lines open weekdays 9 to 5 Eastern time

SPECIAL

WITH YOUR
COCO MAX III ORDER:

- FREE DEMO DISK
- FREE COCOSHOW PROGRAM
- FREE EXTRA FONTS DISK

CoCo Max™ III

must be the most enjoyable, useful, and awesome program you've ever seen or your money back. Instantly, no questions asked.

CALL NOW TOLL FREE 1-800 221 Mon-Fri 9 to 5 EST **AND LET THE FUN BEGIN**

A FEW QUOTES :

An outstanding program that almost turns your CoCo into a replica of the Macintosh. Terrific hi-res color, very easy to learn and use.
- Family Computing

There is absolutely nothing else on the Color Computer that is comparable to CoCo Max's power and ease of use. The most enjoyable time with a computer I ever had.
- Computerware Review

In Everyone's book, CoCo Max is rated again and again as the most incredible product ever marketed for the CoCo.
-CoCo America Club

I never expected to see anything like it on my CoCo screen. There isn't a single command to remember. Even a person who has no drawing ability like myself can create a presentable picture. I've spent hours just doodling enjoying all the things from silly to the serious. Fascinating experience. Buy it, you won't be sorry.
- 6809 Express

Note: *There is only one CoCo Max III.* Do not confuse COLORWARE's *CoCo Max* with similar sounding imitations.

INTRODUCING THE NEXT GENERATION: CoCo Max™ III*

More Resolution · More Power · More Color · Built-in Animation · More Speed · More Type Styles · More Tools · Amazing Color Sequencing

"The best program ever written for the Color Computer"

That's how thousands of enthusiastic users rated the **CoCo Max II** drawing program. With **CoCo Max III** we are ready to amaze them again. Instead of "patching" CoCo Max II, we rewrote it from scratch to take advantage of the CoCo Max III hardware. The results will knock your socks off! Below is a brief list of some of the *new* features, but some, such as **animation**, **color sequencing**, or the **slide show**, have to be seen. Send for the Demo Disk, and see for yourself.

Everybody's favorite drawing package features:
- A 50% larger editing window. - Zoom area **400%** larger. - New drawing tools: **rays**, **3D cubes**, **arcs**,... - New editing tools: shadow,text size,... - Rotate by 1.5° steps - Select any 16 of the 64 possible colors (all 64 colors displayed at once!) - Powerful **color mix**: additive, subtractive, overlay,... - Full **color editing** of patterns and color changing patterns. - Incredible **special effects** with **color cycling** up to 8 colors with variable speed. -**Animation** adds the dimension of motion to your image. (Must be seen.) - Sophisticated data compression saves up to 70% of disk space when saving pictures.

In addition, there are dozens of enhancements to the multitude of features that made CoCo Max II a best seller.

Imagine this picture in sixteen colors!

Guaranteed Satisfaction
Use CoCo Max for a full month. If you are not delighted with it, we will refund every penny.

More about CoCo Max III
- CoCo Max III is not an upgrade of CoCo Max II. It is entirely rewritten to take advantage of the new CoCo 3 hardware (More memory, resolution, colors, speed,...)
- The new CoCo Max III **Hi-Res Interface** and the CoCo Max II **Hi-Res Pack** are *not* interchangable.
- The new interface plugs into the joystick connector.
- The CoCo Max III disk is not copy protected.
- CoCo Max III only works with the CoCo 3.
- A Y-Cable or Multi-pak is not necessary.
- Colors are printed in five shades of gray.
- CoCo Max III can read CoCo Max II pictures.

Note: CoCo Max II (for the CoCo 2) is still available on disk ($79.95). CoCo Max I is still available on tape ($69.95). For details, refer to our double page ad in any *Rainbow* from January '86 to July '87

Toll Free operators are for orders only. If you need precise answers, call the **tech line**. (Detailled CoCo Max specs are included with the Demo Disk.)

Add $3.00 per order for shipping. Visa, MC, checks, M.O. welcome. CT residents add sales tax. C.O.D. add $3.00 extra. Canada: shipping is $5 Overseas add 10%

Technical info: **(203) 656-1806**
Orders only Except in CT **800 221-0916**
Connecticut orders: **(203) 348-9436**
All lines open weekdays 9 to 5 Eastern time

* Beware of inferior imitations that *DO NOT* include a Hi-Res Interface or charge extra for each utility.

System Requirements:
Any CoCo 3 disk system with a Joystick or a Mouse.

We apologize to tape users, CoCo Max III needs the flexibility of a disk.

The **CoCo Max III** system includes: • The special Hi-Res interface (for your mouse or joystick) • The CoCo Max III disk • Many utilities: (To convert Max II pictures, Max colors, etc.) • A detailled User's Manual. Complete system; nothing else to buy. **CoCo Max III: $79.95***

WITH COUPON ONLY

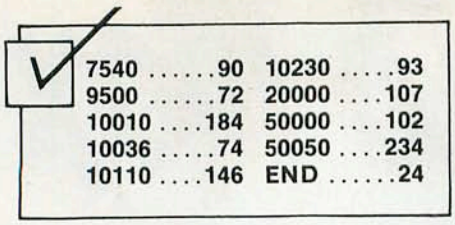
FREE DEMO DISK

Name _____
Street _____
City _____
State Zip _____
Printer used: _____

Please include $2 to help defray Processing and Shipping costs. (Check, Money Order, etc. Sorry, no COD or Credit Cards). Coupon (or copy) must be mailled to:

COLORWARE
A division of Sigma Industries, Inc.

COLORWARE
242-W West Avenue
Darien, CT 06820

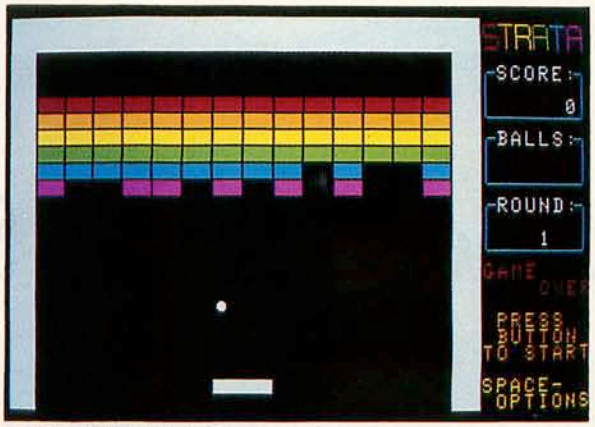


```
7540 .....90   10230 .....93
9500 .....72   20000 ....107
10010 ....184  50000 ....102
10036 .....74  50050 ....234
10110 ....146  END .....24
```

The listing: STRATA

```
1Ø CLEAR9ØØ:GOSUB1ØØØØ:GOSUB9ØØØ
99 GOSUB1ØØ:IFE=1GOTO1ØØ1ØELSE99
1ØØ FORM=ØTOD:V=X:W=Y:X=X+T:Y=Y+
U:IFX<2ORX>=3ØTHENT=-T:X=X+T+T:I
FN THENPLAY"C"
11Ø IFY>=21ORY<3GOSUB75ØØ:IFE=1T
HENRETURNELSEELSEIFHPOINT(X*8,Y*
8)GOSUB7ØØØELSEIFS=G ANDW-F>=13G
OSUB1Ø11Ø:GOSUB8ØØØ
12Ø HCOLORØ:HPRINT(V,W),"%":HCOL
OR1:HPRINT(N*X,Y),"%":NEXT
19Ø L=J:J=FNJ(Ø):IFL<>J ANDJ>=2A
NDJ<=H+QD THENHCOLORØ:HPRINT(L,2
2),B$:HCOLOR1:HPRINT(J,22),B$:RE
TURNELSEJ=L:HPRINT(J,22),B$:RETU
RN
7ØØØ K=INT(Y-F):POKE65466,C(K-3)
*I:U=U*Q:S=S+(11-K)*R:HCOLORØ:HP
RINT(INT(X/2)*2,Y),"#$":PLAYC$(1
2-K):POKE65466,Ø:IFD=BS-1ANDK<8T
HEND=BS:RETURNELSERETURN
75ØØ IFY>=24GOSUB9ØØØ:RETURNELSE
IFY<3THENIFH=ØTHENH=(PD-24+2)/2:
B$=SP$:HCOLORØ:HPRINT(J,22),LP$E
LSEELSEIFY<23ANDU>ØANDX>=J ANDX<
J-H+PD-22THENJ=J+.1:IFY=22THENY=
21:T=SGN(X):U=.5ELSEIFRND(3)=1TH
ENPLAY"C":ONRND(3)GOTO751Ø,753Ø,
754ØELSEELSERETURN
75Ø1 J=J+.1:U=-U:PLAY"C":RETURN
751Ø T=SGN(T)/2:U=-1:RETURN
753Ø T=SGN(T):U=-1:RETURN
754Ø T=-SGN(T):U=-ABS(U):RETURN
8ØØØ O=K:K=Z:Z=O:FORA=2TO7:HCOLO
RI*1Ø+A-I*A:HPRINT(2,F+A+3),"#$#
$#$#$#$#$#$#$#$#$#$#$#$#$":NEXT:
RETURN
9ØØØ J=J+.1:H=Ø:D=BS-1:N=Ø:HCOLO
RØ:HPRINT(V,W),"%":HCOLORØ:HPRIN
T(J,22),B$:J=2:B$=LP$:FORZ=1TO1Ø
:GOSUB19Ø:PLAY"O2CO4":NEXT:BL=BL
-1:IFP GOSUB95ØØ:IFBL=-1THEN5ØØØ
Ø
9Ø1Ø IFBUTTON(Ø)=ØANDP GOSUB19Ø:
GOTO9Ø1ØELSEV=1Ø:W=23:X=2+RND(5)
:Y=11+F:HCOLORØ:HPRINT(33+BL,9),
"%":HCOLOR1:HPRINT(X,Y),"%":XX=X
:YY=Y
9Ø2Ø IFBUTTON(Ø)ANDP GOSUB19Ø:GO
TO9Ø2ØELSEN=1:T=1:U=1:X=XX:Y=YY:
PLAY"V31":RETURN
95ØØ S=S-INT(S/1ØØØØØØ)*1ØØØØØØ:
PLAY"O5":HCOLOR1:VZ=V:WZ=W:OT=T:
OU=U:OD=D:NZ=N:XZ=X:YZ=Y:D=1:N=Ø
:LS=LEN(STR$(S)):FORYY=1TOØSTEP-
1:FORXX=ØTO9:HCOLORYY+RND(6)*YY:
PLAYSTR$(XX+1):HPRINT(4Ø-LS,5),S
TRING$(LS-1,48+XX):HCOLOR-YY+1:H
PRINT(39-LS,5),S
951Ø HCOLOR1:GOSUB19Ø:NEXTXX,YY:
V=VZ:W=WZ:T=OT:U=OU:N=NZ:X=XZ:Y=
YZ:D=OD:PLAY"O4":RETURN
1ØØØØ ON BRK GOTO25ØØØ:DIMC$(12)
:POKE65497,Ø:WIDTH4Ø:PALETTEØ,Ø:
PALETTE11,63:CLS1:Q=-1:RP=1:LOCA
TE3,1Ø:ATTR3,Ø:PRINT"Is this an
RGB color monitor? (Y/N)":ATTR2,
Ø:PRINT:DATAØ,63,36,52,54,18,25,
45,18,56,Ø,Ø,63,24,38,52,33,29,2
6,33,32,Ø
1ØØØ1 A$=INKEY$:IFA$="N"ORA$="n"
THENCS=16:GOSUB1ØØØ6:GOSUB1ØØØ7E
LSEIFA$="Y"THENCS=7:GOSUB1ØØØ7:G
OSUB1ØØØ6ELSE1ØØØ1
1ØØØ5 BS=1:QD=26:PD=QD:LP$="###$
":SP$="#$":PLAY"T255O5B":WIDTH4Ø
:ATTRØ,Ø:FORX=ØTO31:READC:POKEX+
61621,C:NEXT:GOTO1ØØ1Ø:DATA255,2
55,255,255,255,255,255,Ø,254,254
,254,254,254,254,254,Ø,Ø,Ø,28,62
,62,62,28,Ø,124,13Ø,154,162,154,
13Ø,124,Ø
1ØØØ6 FORX=ØTO1Ø:READC:NEXT:FORX
=1TO12:C$(X)=STR$(X):NEXT:RETURN
1ØØØ7 FORX=ØTO1Ø:READC(X):PALETT
EX,C(X):NEXT:RETURN
1ØØ1Ø ONBRK GOTO2ØØØØ:E=Ø:GOSUB1
1ØØØ:FORX=2TO7:PALETTEX,Ø:NEXT:T
I$="C2R6EU4HL6HU4ER6C3BR2R8L4D12
BR6C4U12R7FD4GL7R6F2D4BR2C5U11ER
6FD5NL8D6BR6C6C6U12L4R8BR3C7R6FD
5NL8D6BL8U11E":FORX=ØTO2:FORY=ØT
O2:HDRAW"S2ØBM"+STR$(23+X)+","+S
TR$(1ØØ+Y)+TI$:NEXTY,X
1ØØ15 PLAY"T255L255O4":FORX=2TO7
:PALETTEX,C(X):SOUNDX*1Ø,2:NEXT:
ST$="by Michael Sirolly":FORX=22
TO15STEP-1:HCOLORØ:HPRINT(11,X+1
),ST$:HCOLOR1:HPRINT(11,X),ST$:P
LAY"V2Ø;"+STR$(25-X):NEXT
1ØØ2Ø OC=15:C=11:FORX=ØTO39:PALE
TTEC,C(4):HCOLORC:HPRINT(39-X,23
),"%":HPRINT(X,Ø),"%":C=C+1:IFC=
16THENC=11:NEXTELSENEXT
1ØØ25 HCOLOR9:HPRINT(6,18),"vers
ion 1.Ø      & June, 1987":PLAY"V
31O4":FORX=1TO6:PLAY"CV-V-V-V-V-
":NEXT:PLAY"V31":T=1ØØ
1ØØ3Ø T=T-1:GOSUB111ØØ:IFBUTTON(
Ø)GOTO1Ø13ØELSEIFBUTTON(1)ORINKE
```

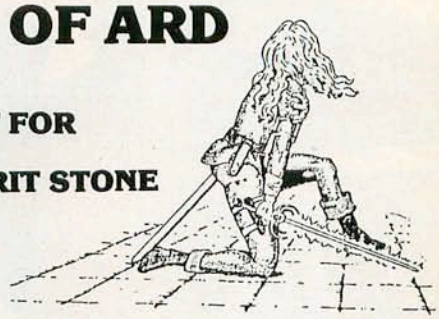
```
Y$=" "GOTO1Ø2ØØELSEIFT THEN1ØØ3Ø
1ØØ35 IFHI$(1)<>""THENT=1ØØ:HCOL
OR15:Z$=STRING$(4Ø,"%"):HPRINT(Ø
,Ø),Z$:HPRINT(Ø,23),Z$:FORX=1TO1
2:PALETTEX,Ø:NEXT:HCOLOR1Ø:HPRIN
T(15,5),"TOP SCORES":HDRAW"S4C11
BM116,43L39GD96FR166EU96HL4Ø"ELS
E1Ø05Ø
1ØØ36 PALETTE11,C(6):PALETTE12,C
(1):HCOLOR12:FORX=1TO1Ø:IFHI$(X)
<>""THENST$=RIGHT$(STR$(X),2)+".
 "+HI$(X):HPRINT(1Ø,6+X),ST$:NEX
TELSENEXT
1ØØ4Ø PALETTE1Ø,RND(63):T=T-1:IF
BUTTON(Ø)GOTO1Ø13ØELSEIFBUTTON(1
)ORINKEY$=" "GOTO1Ø2ØØELSEIFT TH
ENIF(T/1Ø)-INT(T/1Ø)>.4THENPALET
TE15,C(4):GOTO1ØØ4ØELSEPALETTE15
,CS:GOTO1ØØ4Ø
1ØØ5Ø S=Ø:R=1:F=Ø:GOSUB112ØØ:HCO
LOR1:HPRINT(39-LEN(STR$(SP)),5),
SP:HPRINT(36-LEN(STR$(RP))/2,13)
,RP:P=Ø:DEF FNJ(K)=X+T:V=3:W=3:H
COLOR1,Ø:G=-1:BL=5:GOSUB9ØØØ:TI=
2ØØ
1ØØ55 S$="GAME         OVER
   PRESS    BUTTON TO START
  SPACE-    OPTIONS":FORZ=ØTO8:HC
OLORZ/3+2:HPRINT(32,15+Z),MID$(S
$,1+Z*8,8):NEXT
1ØØ6Ø GOSUB1ØØ:IFBUTTON(Ø)GOTO1Ø
13ØELSEIFBUTTON(1)ORINKEY$=" "TH
EN1Ø2ØØELSEIFS<6Ø+Q*4ØGOTO1ØØ6ØE
LSE1ØØ1Ø
1Ø1ØØ R=1:F=Ø:GOSUB112ØØ:T=-1:S=
Ø:P=1:FORX=1TO5:HPRINT(32+X,9),"
%":PLAY"O5V31GV26GV21GV16GV11GV6
GV1GV31":NEXT:V=3:W=3:BL=5:R=Ø:D
EF FNJ(A)=INT(JOYSTK(Ø)/((PD-H)/
1Ø)+2)
1Ø11Ø HCOLORØ:HPRINT(34,13),"###
#":R=R+1:HCOLOR1:HPRINT(36-LEN(S
TR$(R))/2,13),R:G=294*R+S:F=R-1:
```




```
IFF>8THENF=8
1Ø12Ø RETURN
1Ø13Ø GOSUB1Ø1ØØ:GOSUB9ØØØ:GOTO9
99
1Ø2ØØ HCLSØ:FORX=ØTO1Ø:PALETTEX,
C(X):NEXT:HCOLOR1:HPRINT(16,7),"
OPTIONS:":HDRAW"S4C6BM124,59L15G
D62FR1ØØEU62HL15"
1Ø21Ø L=9:C1$="YES":C2$="NO":OP$
="REBOUND?":R$(Ø)="REBOUND.":R$(
1)="DEMOLISH.":GOSUB1Ø25Ø:Q=R:OP
$="VISIBLE?":R$(Ø)="VISIBLE.":R$
(1)="INVISIBLE.":GOSUB1Ø25Ø:I=(R
+1)/2
```


THE POWER STONES OF ARD

THE QUEST FOR THE SPIRIT STONE



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"QUEST FOR THE SPIRIT STONE" is an Adventure that will keep you playing for hours. It features single keystroke commands, 16 color graphics, 100% Hi-Res graphics screens, full game save, extensive playing area, level advancement, and the disk is not copy-protected. You choose your character's name, race, sex, and ability scores. The use of arrow keys simplify movement. This one is easy to play but a challenge to complete!

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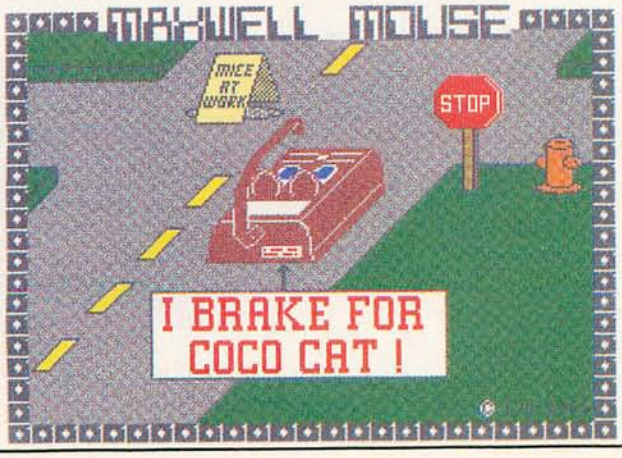

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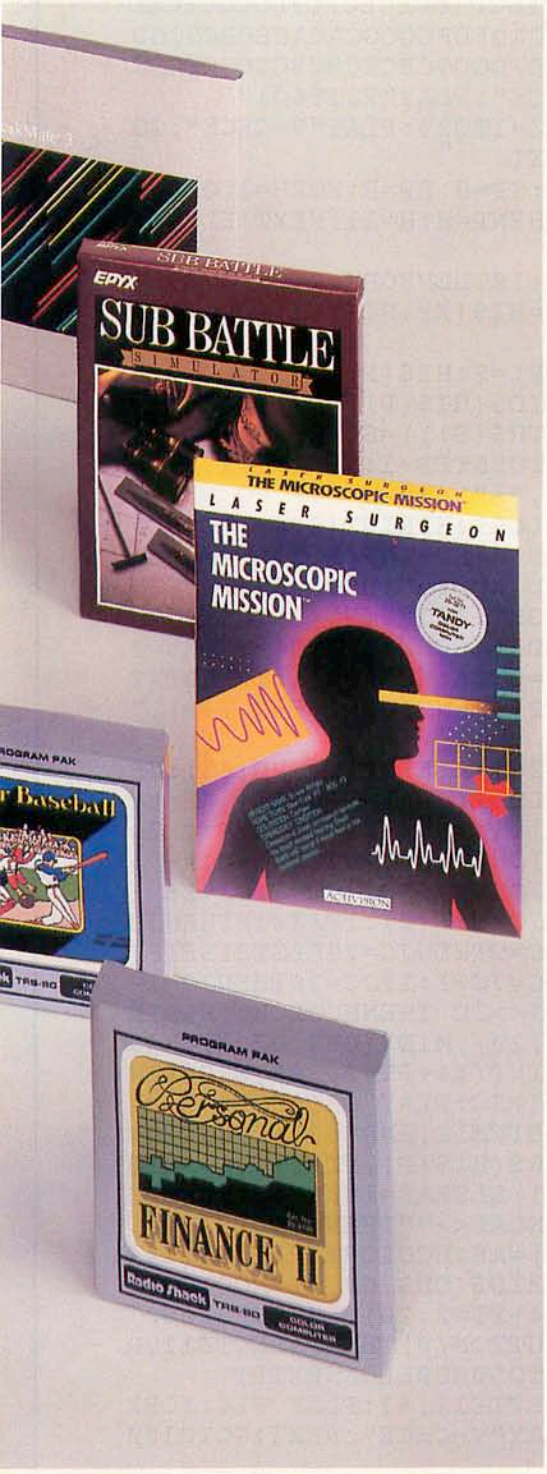

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At Radio Shack, we're dedicated to making sure that you never run out of ways to use and enjoy your Color Computer. We've got a terrific line of software—here's just a sample.

Games for the whole family

Let your Color Computer open the door to fun and adventure. Radio Shack has a dazzling selection of various types of popular and challenging games.

You can learn the basics of flying in *Flight Simulator II,* or play a game of cat-and-mouse with enemy subs in *Sub Battle Simulator.*

Our exciting Program Pak™ games let you explore a secret cave in *Downland.* Battle enemy robots in *Thexder.* Uncover hidden treasure in *Springster.* Play Mahjong in *Shanghai* . . . or play ball with *Color Baseball.*

Make learning fun

One of the greatest potential uses of your Color Computer is giving your child a head start in education. We've got programs that cover a variety of disciplines, and are fun, too!

Children will learn computer skills with *BASIC-09 Tour Guide. The Color Computer Artist* may bring out the Van Gogh in your child! Geography is made easy in *Where in the World is Carmen Sandiego?* And *Microscopic Mission* lets your child explore the human body—from the inside out.

Boost home productivity

No matter what your personal needs, we have programs that will put your Color Computer to work when you need it most.

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Programming tools

You'll find your Color Computer is much more than a game computer. Our programming software lets you fully enjoy the benefits of owning a home computer, and designing and running your own programs.

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```
1Ø215 OP$="SPEED?":C1$="SLOW":C2
$="FAST":R$(Ø)="SLOW SPEED.":R$(
1)="FAST SPEED.":GOSUB1Ø25Ø:BS=(
R+1)/2+1:OP$="PADDLES?":C1$="LAR
GE":C2$="SMALL":A$=" SIZE.":R$(Ø
)=C1$+A$:R$(1)=C2$+A$:GOSUB1Ø25Ø
1Ø22Ø HCOLOR1:HPRINT(14,14),"PRE
SS BUTTON":IFR=1THENLP$="#$":SP$
="$":QD=28:PD=24ELSELP$="###$":S
P$="#$":QD=26:PD=QD
1Ø23Ø IFBUTTON(Ø)ORBUTTON(1)ORIN
KEY$<>""THENHCLSØ:GOTO1ØØ5ØELSE1
Ø23Ø
1Ø25Ø HCOLOR1:HPRINT(15,L),OP$:P
ALETTE2,C(9):PALETTE3,C(9):HCOLO
R2:HPRINT(14,14),C1$:HCOLOR3:HPR
INT(26-LEN(C2$),14),C2$
1Ø26Ø Z=RND(63):IFJOYSTK(Ø)<33TH
ENR=-1:P1=Z:P2=C(9)ELSER=1:P2=Z:
P1=C(9)
1Ø27Ø PALETTE2,P1:PALETTE3,P2:IF
BUTTON(Ø)<>1THEN1Ø26ØELSEPLAY"T2
55O5B"
1Ø28Ø IFBUTTON(Ø)THEN1Ø28Ø
1Ø29Ø HCOLORØ:HPRINT(15,L),OP$:H
PRINT(14,14),C1$:HPRINT(26-LEN(C
2$),14),C2$:HCOLOR9:HPRINT(15,L)
,R$((R+1)/2):L=L+1:PALETTE2,C(2)
:PALETTE3,C(3):RETURN
11ØØØ FORX=ØTO15:PALETTEX,Ø:NEXT
:HSCREEN2:FORX=ØTO1Ø:PALETTEX,C(
X):NEXT:RETURN
111ØØ PALETTEC,C(4):PALETTEOC,CS
:OC=C:C=C+1:IFC=16THENC=11:RETUR
NELSERETURN
112ØØ GOSUB11ØØØ:FORX=1TO1Ø:PALE
TTEX,Ø:NEXT:HDRAW"S4BMØ,ØC1D191R
14U174R226D174R15U191":HPAINT(1,
1),1:HDRAW"BM258,15"+TI$:GOSUB8Ø
ØØ
1121Ø S$="L4GD2ØFR54EU2ØHL4BL46B
D32":HDRAW"C6BM263,27"+S$+S$+S$:
HCOLOR1:HPRINT(33,7),"BALLS:":HP
RINT(33,11),"ROUND:":HPRINT(33,3
),"SCORE:":FORX=1TO1Ø:PALETTEX,C
(X):NEXT:RETURN
2ØØØØ HCOLOR6,Ø:HSCREEN2:FORX=ØT
O1Ø:PALETTEX,C(X):NEXT:PALETTE13
,C(6):HDRAW"S4C13BM117,83L4GD22F
R92EU22HL4":HCOLOR1:HPRINT(15,1Ø
),"QUIT GAME?":HCOLOR11:HPRINT(1
5,12),"YES":HCOLOR12:HPRINT(23,1
2),"NO"
2ØØ1Ø A=RND(63):IFJOYSTK(Ø)<33TH
ENC1=A:C2=C(9)ELSEC1=C(9):C2=A
2ØØ2Ø PALETTE11,C1:PALETTE12,C2:
IFBUTTON(Ø)THENIFJOYSTK(Ø)>32THE
N1ØØ1ØELSEELSE2ØØ1Ø
2ØØ3Ø A$=STRING$(4Ø,"$"):PALETTE
13,Ø:FORX=1TO12:HCOLORX-INT((X-1
)/6)*6+1:HPRINT(Ø,12-X),A$:HPRIN
T(Ø,11+X),A$:NEXT:FORX=1TO12:HCO
LORØ:HPRINT(Ø,12-X),A$:HPRINT(Ø,
11+X),A$:NEXT
2ØØ4Ø FORX=ØTO15:PALETTEX,Ø:NEXT
:WIDTH4Ø:FORX=ØTO8:PALETTEX,C(X)
:NEXT:POKE65496,Ø:END
25ØØØ RUN
5ØØØØ HCOLOR2:HPRINT(32,15),"GAM
E":HPRINT(36,16),"OVER":HCOLOR1:
PL$="T6V2ØO2L16CP16CP16CP16CP16C
P16CP16CP16CP16CECECFCFCGCGCECED
FDFDGDGDADADFDFCGCGCACACBCBCGCGD
ADADGDGDFDFDGDGCECECBCBCGCGCECEC
BCBCGCGCECE":PLAY"V31T6O1"
5ØØØ5 FORZ=1TO29:PLAY"V-CECE":GO
SUB19Ø:NEXT
5ØØ1Ø E=1:SP=S:RP=R:FORH=1TO1Ø:I
FS>SC(H)THENP=H:H=11:NEXT ELSENE
XT:RETURN
5ØØ2Ø IFP<1ØTHENFORX=9TOP STEP-1
:HI$(X+1)=HI$(X):SC(X+1)=SC(X):N
EXT
5ØØ3Ø SC(P)=S:HI$(P)=". . . . .
. . . ":MID$(HI$(P),17-LEN(STR$(
S)),LEN(STR$(S)))=STR$(S):HCOLOR
Ø:FORX=23TO5STEP-1:HPRINT(2,X),S
TRING$(28,"#"):NEXT
5ØØ4Ø HCOLOR9:HPRINT(8,4),"CONGR
ATULATIONS!":HPRINT(5,7),"You ac
hieved top score":HCOLOR1Ø:HPRIN
T(4,9),RIGHT$(STR$(P),2):HDRAW"B
M26,74R4BD2L4RDNU4BR2NU4":FORX=Ø
TO21:FORY=ØTO6:HCOLOR11:IFHPOINT
(X+25,Y+72)THENHPRINT(5+X,Y+9),"
$"
5ØØ5Ø OJ=26:PALETTE11,RND(63):NE
XTY,X:HCOLOR9:HPRINT(6,17),"Ente
r your initials:":A$=INKEY$:CH$=
"ABCDEFGHIJKLMNOPQRSTUVWXYZ.*-":
HCOLOR11:FORPT=ØTO2:JC=1:OJ=26
5ØØ6Ø JX=JOYSTK(Ø):IFJX<1ØTHENJC
=JC-1:IFJC=ØTHENJC=29ELSEELSEIFJ
X>54THENJC=JC+1:IFJC=3ØTHENJC=1
5ØØ65 IFOJ<>JC THENHCOLORØ:HPRIN
T(14+PT*2,2Ø),MID$(CH$,OJ,1):HCO
LOR11:HPRINT(14+PT*2,2Ø),MID$(CH
$,JC,1):OJ=JC:PLAY"O5T255B"
5ØØ7Ø PALETTE11,RND(63):IFBUTTON
(Ø)THENMID$(HI$(P),PT*2+1,1)=MID
$(CH$,JC,1)ELSEA$=INKEY$:IFINSTR
(CH$,A$)ANDA$<>""THENMID$(HI$(P)
,PT*2+1,1)=A$:HCOLORØ:HPRINT(14+
PT*2,2Ø),MID$(CH$,OJ,1):HCOLOR11
:HPRINT(14+PT*2,2Ø),A$ELSE5ØØ6Ø
5ØØ8Ø IFBUTTON(Ø)THENPALETTE11,R
ND(63):GOTO5ØØ8ØELSENEXTPT
5ØØ9Ø PALETTE11,63:PLAY PL$:FORX
=1TO2Ø:PLAY"V-CECE":NEXT:GOTO1ØØ
1Ø
```

Telewriter-128™

the Color Computer 3 Word Processor

For over 5 years now, Telewriter has been the #1 Color Computer word processor, both in popularity and in performance. Telewriter's near perfect mix of sophisticated professional features and a very natural user interface, has earned it the highest praise in numerous magazines, and an intensely loyal following among tens of thousands of Color Computer users all over the world.

HISTORY

Throughout the history of the Color Computer, Telewriter has pioneered software breakthroughs that set the standards.

In 1981, it was Telewriter 1.0 that first took the Color Computer's inadequate 32X16 all-uppercase display, and replaced it with a graphics-based 51X24 upper and lowercase display.

A few years later, Telewriter-64 added high density 64X24 and 85X24 displays and access to the full 64K of the newer Color Computers.

THE NEW AGE

Today, Telewriter-64 is recognized as the standard Color Computer word processor. It runs on all Tandy Color Computers — from the original Color Computer 1, to the Color Computer 2, and 3.

But the Color Computer 3 brings a whole new level of power to low cost computing and, so, a new Telewriter is here to put that power to work for you. We call it Telewriter-128.

TELEWRITER-128

You don't mess with a good thing, so Telewriter-128 is still Telewriter-64 at heart. The commands, and the user interface are essentially the same. If you know Telewriter-64, then you already know Telewriter-128. And, if you don't know Telewriter-64, you'll still have an easy time learning and using Telewriter-128.

80 COLUMNS

But there are major differences as well. First, Telewriter-128 uses the Color Computer 3's new 80 column screen display.

This means, simply, that using Telewriter-128 on a low cost Color Computer 3 will look a lot like using a more expensive word processor on a much more expensive IBM PC, PS/2, or clone.

SPEED

Second, Telewriter-128 is lightning fast. Telewriter-64 was fast in its own right, but, by accessing the Color Computer 3's video hardware directly, and by running the machine in double speed mode, Telewriter-128 is able to provide extremely fast scrolling and instant paging — functions whose speed is crucial to serious word processing.

In this department, Telewriter-128 doesn't simply keep up with IBM-based word processors — it generally surpasses them!

EASE

Third, Telewriter-128 adds a host of new features big and small, that make it even easier to use.

Features like: Quick function key access to the editor or the menus — an instant on-line help screen summarizing all Telewriter commands and special characters — an option file where you store your personal set of format and screen settings so you only have to set them once!

Then, there's a quick save feature which allows you to save all your current work without leaving the editor. There's a simple way to cursor through the disk directory and read in a file by just hitting ENTER. And there's more.

NEW POWER

Telewriter-64 always had the power to handle any kind of serious writing, from letters to textbooks. But, here too, Telewriter-128 adds major features.

Like Macros — which let you insert whole words or phrases (even sets of control codes or format commands) into your text, with a single keypress. And every time you power up Telewriter-128, the macro definitions are automatically loaded*, so they're always there.

Then there's a Print Preview feature that shows you, on-screen, the way your printed text will look — with margins, headers, centering, justification, page numbering, and page breaks. This guarantees letter perfect documents every time, and makes tasks like widow/orphan line elimination, a breeze.

TELEWRITER-64 OR TELEWRITER-128

We could go on listing features, but the point is this: If you own a Color Computer, you already have the hardware for the most powerful, low cost word processor in town. All you need now is to add the heart and soul:

Telewriter-64, for the Color Computer 1 and 2, costs $59.95 on disk, $49.95 on cassette.

Telewriter-128 for the Color Computer 3 costs $79.95 on disk, $69.95 on cassette.

To order by Mastercard or Visa call (619) 755-1258 anytime, or send check or money order plus $2 shipping (Californians add 6% sales tax) to:

COGNITEC
704 Nob Ave.
Del Mar, CA 92014

To upgrade from Telewriter-64 to Telewriter-128, return your original disk or cassette with $39.95. (Add $10 if you're also upgrading from cassette to disk. Deduct $10 with proof of Oct '87 - Feb '88, purchase of Telewriter-64.)

When I first got Telewriter-64 last year, I was in heaven. I couldn't believe the program's versatility and ease of use.
-The RAINBOW, Oct. 1985

TELEWRITER-64 FEATURES: Compatibility with any printer that works with the Color Computer; embedded control codes for underlining, boldface, sub/superscript, variable fonts; format commands for headers, centering, margin and spacing changes anywhere in the document; Format menu to set margins, spacing, page numbering, BAUD rate, lines per page, justification; Chain printing for one shot printing of multi-file documents. Fast, full-screen editor with wordwrap, block copy/move/delete, global search and replace, wild card search, fast 4-way auto-repeat cursor, fast scrolling, forward and backward paging, text alignment, tabs, error protection, word and line counter. Insert or delete text anywhere on the screen. Simple, easy to remember commands. Optional ASCII files for compatibility with spell checkers, terminal programs, and BASIC. Load, save, append, partial save files to disk or cassette. Kill, rename and list disk files. Cassette verify and auto-retry on error.

TELEWRITER-128 - ADDITIONAL FEATURES: Print preview from editor; multiple copy print; footers; hanging indents; cursor thru disk directory to load, append, rename and kill files; quick file save from editor; keyclick; key repeat; true block move; 24, 25, or 28 line screen; 40 or 80 column screen; dual speed cursor; on-line help; overstrike mode; word delete; wordwrap at margin; user definable macros; nested macros; instant status window for information on cursor position, word count, etc.; instant function key access to menus or editor; options menu for setting character and screen colors, key repeat and delay rates, definable foreign symbols.

RAINBOW CERTIFICATION SEAL

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A strategy game for two players

One Good Turn Deserves Another

By Eric Tucker

You're leading your opponent by a score of 33 to 30, and it's his move. Only two spaces, E3 and G8, are left on the board. If he picks G8, it's all over for you. Tensely, you wait as he ponders his move. . . .

Flip It is a strategy game designed for a 16K CoCo 2 with Extended Color BASIC. Two people are needed to play.

The game board is an eight-by-eight grid, marked as 1-8 vertically and A-H horizontally. Four markers, two white and two black, are placed on the four center squares. The idea is to place your markers in such a way as to "sandwich" your opponent's markers between two of yours. For example, in Figure 1, a black marker is at B6. Going up diagonally, there are three white markers and a blank space. By placing a black

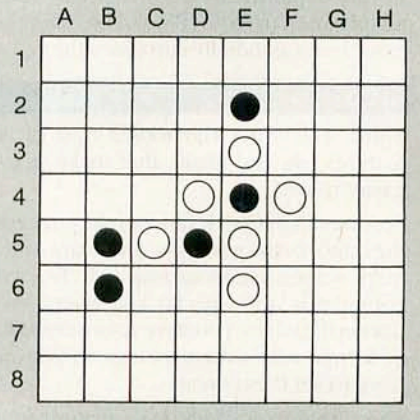


Figure 1

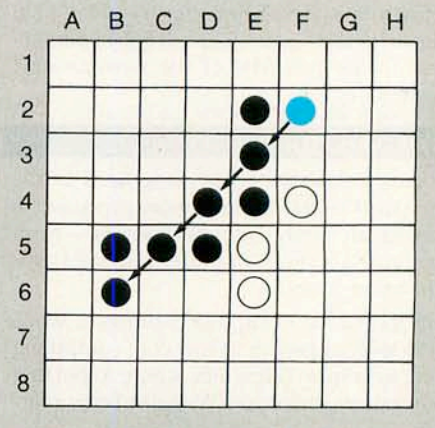


Figure 2

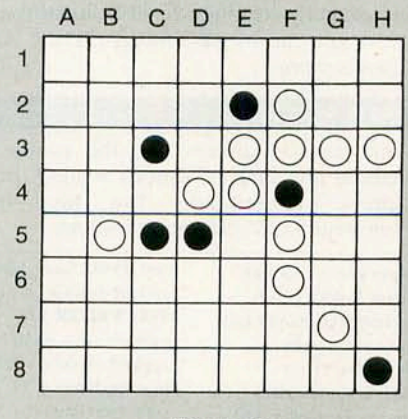


Figure 3

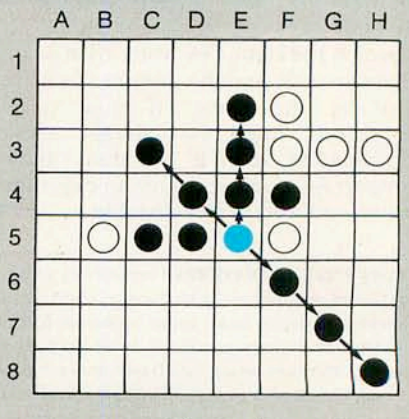


Figure 4

Eric Tucker is a student at Baruch College, where he is working on his bachelor's degree in computer science. He owns both the MC-10 and the CoCo, but his programming is done exclusively on the CoCo.

marker at F2, the white markers all "flip" to black (Figure 2).

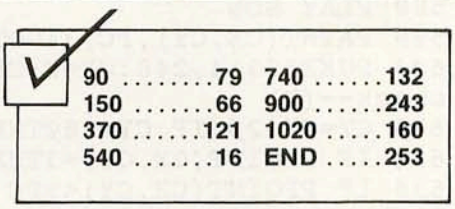
More than one line can be flipped. In Figure 3, a black marker can be placed at E5. The white markers would be flipped in this order: north, two markers; southeast, two markers; and northwest, one marker. This results in Figure 4. As long as there is a marker of your opponent's color and one of your color opposite a blank space, you can move to that location. Whether horizontally, vertically, or diagonally placed, the markers in between will be flipped.

To type in your coordinates, just press a key. The screen will clear and ask you for the coordinates (letter, number). If you want to look at the board again before you make your move, just type I,9. The board will reappear, but it will still be your turn. If you type in coordinates that are already occupied, a beep will sound and you will be asked again for the coordinates.

In the upper left-hand corner, a small section of the playing board shows a marker, the color of which shows whose turn it is. The computer keeps track of both players' scores and displays them on the screen. *You must place your marker next to another.* Most of the time, you also have to be able to flip something. If either one of these rules is broken, your marker will not be placed on the screen and you will lose your turn. You cannot flip your own color, since it is already yours.

The game ends when either the board is filled or one marker color is wiped out. The winner is the one with the most markers on the board. Good luck!

(Questions or comments regarding this program may be directed to the author at 2950 Park Ave., Apt. 114, Bronx, NY 10451. Please enclose an SASE when requesting a reply.) □



90	79	740	132
150	66	900	243
370	121	1020	160
540	16	END	253

The listing: FLIPIT

```
10 REM **** FLIP IT ****
20 REM * BY ERIC TUCKER *
30 CLS:PRINT@64," ******* F L I
P   I T ******":PRINT@96,"((( DE
SIGNED BY ERIC TUCKER )))":PRINT
@192," TWO PEOPLE ARE NEEDED TO
PLAY.":PRINT@256,"      <<<<PRESS
 ENTER>>>>":EXEC44539
40 PMODE3:SCREEN1,0:POKE65314,24
8:PCLS2:CIRCLE(128,96),255,1,1,.
65,.35
50 LINE(180,0)-(182,191),PRESET,
BF:DRAW"C3":LINE(10,10)-(170,170
),PSET,BF
60 FORX=10TO170STEP20:LINE(X,10)
-(X,170),PRESET:NEXT:FORY=10TO17
0STEP20:LINE(10,Y)-(170,Y),PRESE
T:NEXT:CIRCLE(6,6),4,1:PAINT(6,6
),1,1
70 DRAW"C1BM10,8;BR6U6R4D6U3NL4D
3BR16U6R4D3L4R6D3NL6BR14U6NR4D6R
4BR16U6R2F2D2G2NL2BR18U6NR4D3NR4
D3R4BR16U6NR4D3R4BD3BR16U6NR6D6R
6U3NL2D3BR14U6D3R4U3D6"
80 DRAW"BM4,10BD4D6R2L4R2U5NL2D5
L2BD16R4D3L4D3R4BD16NL4D3NL4D3L4
BD14D3R4U3D6BD14L4D3R4D3L4BD14BR
4L4D6R4U3L4BD18R4D6BD12L4D6R4U6D
3L4C3"
90 LINE(200,10)-(240,30),PSET,BF
:LINE(210,10)-(210,30),PRESET:LI
NE(230,10)-(230,30),PRESET:LINE(
198,9)-(242,31),PRESET,B:LINE(18
0,40)-(255,42),PRESET,BF
100 DRAW"BM196,50C1D6R6U3L6R4U3N
L4BR6D6R6BR4U6R4D6U3NL4D3BR4NR4U
6R4BR4D6U3R2NE3F3BD4L40":LINE(18
0,80)-(255,82),PRESET,BF
110 DRAW"BM196,90D6R4NU4R4U6BR4D
6U3R4U3D6BR4U6BR4R4L2D6BR6NR4U3N
R4U3R4BD10L36":LINE(180,120)-(25
5,122),PRESET,BF
120 DRAW"BM192,130;ND6R4D3NL4BD3
BR4U6R4D3L4R3D2R1D1R2BR4NR4U3NR4
U3R4BR4NR4D3R4D3NL4BR4R4U3L4U3R4
BR12ND6R4D6U3L4BM204,140D6U3R2NE
3F3R1BR4NR4U3NR4U3R4BR4F4NE4D2"
130 DRAW"C4":LINE(204,150)-(228,
160),PSET,BF:LINE(204,150)-(228,
160),PRESET,B
```

TEXTFORM

TEXTFORM is compatible with all Color Computers with a minimum of 64K, disk drive, and printer. This machine language program will format ASCII text files into two column pages quickly and easily. This is not another word processor. TEXTFORM is a user defineable two column text formatter program which will allow your Color Computer to create very professional documents without hours of tedious work. TEXTFORM is a versitile enhancement to any word processing system whether you are a casual or professional user.

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```
14Ø CIRCLE(8Ø,8Ø),6,1:PAINT(8Ø,8
Ø),1,1:CIRCLE(1ØØ,1ØØ),6,1:PAINT
(1ØØ,1ØØ),1,1:CIRCLE(8Ø,1ØØ),6,4
:PAINT(8Ø,1ØØ),4,4:CIRCLE(1ØØ,8Ø
),6,4:PAINT(1ØØ,8Ø),4,4:CIRCLE(2
2Ø,2Ø),6,1:PAINT(22Ø,2Ø),1,1:PC=
1
15Ø SD$="T6L64V3ØO1EEEV2ØEEEV15E
EEV1ØEEEV5EEE"
16Ø PAINT(22Ø,2Ø),PC,3:GOSUB89Ø:
SOUND2ØØ,1:EXEC44539:CLS:IF BS+W
S=64THEN1ØØØ
17Ø IF BS=Ø OR WS=Ø THEN 1ØØØ
18Ø REM ask for input
19Ø IF PC=1 THEN PC=128 ELSE PC=
2Ø7
2ØØ PRINT"USE 'I,9' TO LOOK AT B
OARD AGAIN":PRINT
21Ø PRINT"PLAYER: ";STRING$(5,PC
):IFPC=128THENPC=1ELSEPC=4
22Ø GOTO 24Ø
23Ø SOUND1Ø,1Ø
24Ø INPUT"POSITION(LETTER,NUMBER
)";C$,R:SCREEN1,Ø:POKE65314,248
25Ø IF C$=""OR R=ØTHEN16Ø
26Ø C=ASC(C$)-64
27Ø IF C=9 OR R=9 THEN 16Ø
28Ø IF C<Ø OR C>8 OR R<Ø OR R>8
THEN 23Ø
29Ø IF C=Ø OR R=Ø THEN 16Ø
3ØØ X=C*2Ø:Y=R*2Ø:IFPPOINT(X,Y)<
>3THEN23Ø
31Ø CX=X:CY=Y:REM #1 check
32Ø REM #2 check--(N)
33Ø CY=CY-2Ø:IF CY=Ø THEN39Ø
34Ø IFPPOINT(CX,CY)=3THEN39Ø
35Ø IFPPOINT(CX,CY)<>PC THEN33ØE
LSE SX=CX:SY=CY:CX=X:CY=Y:CIRCLE
(X,Y),6,PC:PAINT(X,Y),PC,PC
36Ø CY=CY-2Ø:IF CY=SY THEN 39Ø
37Ø PLAY SD$
38Ø CIRCLE(CX,CY),6,PC:PAINT(CX,
CY),PC,PC:GOTO36Ø
39Ø POKE65314,248:CX=X:CY=Y:REM
#2 check--(NE)
4ØØ CY=CY-2Ø:CX=CX+2Ø:IF CY=Ø OR
 CX=18Ø THEN 46Ø
41Ø IFPPOINT(CX,CY)=3THEN46Ø
42Ø IFPPOINT(CX,CY)<>PC THEN4ØØE
LSE SX=CX:SY=CY:CX=X:CY=Y:CIRCLE
(X,Y),6,PC:PAINT(X,Y),PC,PC
43Ø CY=CY-2Ø:CX=CX+2Ø:IFCX=SX AN
D CY=SY THEN 46Ø
44Ø PLAY SD$
45Ø PAINT(CX,CY),PC,3:GOTO43Ø
46Ø POKE65314,248:CX=X:CY=Y:REM
check--(E)
47Ø CX=CX+2Ø:IFCX=18ØTHEN53Ø
48Ø IF PPOINT(CX,CY)=3THEN53Ø
49Ø IFPPOINT(CX,CY)<>PC THEN47ØE
LSE SX=CX:SY=CY:CX=X:CY=Y:CIRCLE
(X,Y),6,PC:PAINT(X,Y),PC,PC
5ØØ CX=CX+2Ø:IF CX=SX AND CY=SY
THEN 53Ø
51Ø PLAY SD$
52Ø PAINT(CX,CY),PC,3:GOTO5ØØ
53Ø POKE65314,248:CX=X:CY=Y:REM
check--(SE)
54Ø CX=CX+2Ø:CY=CY+2Ø:IF CX=18ØO
RCY=18ØTHEN6ØØ
55Ø IF PPOINT(CX,CY)=3THEN6ØØ
56Ø IFPPOINT(CX,CY)<>PC THEN54ØE
LSE SX=CX:SY=CY:CX=X:CY=Y:CIRCLE
(X,Y),6,PC:PAINT(X,Y),PC,PC
57Ø CX=CX+2Ø:CY=CY+2Ø:IF CX=SX A
ND CY=SY THEN 6ØØ
58Ø PLAY SD$
59Ø PAINT(CX,CY),PC,3:GOTO57Ø
6ØØ POKE65314,248:CX=X:CY=Y:REM
check--(S)
61Ø CY=CY+2Ø:IF CY=18ØTHEN67Ø
62Ø IF PPOINT(CX,CY)=3THEN67Ø
63Ø IF PPOINT(CX,CY)<>PC THEN61Ø
ELSE SX=CX:SY=CY:CX=X:CY=Y:CIRCL
E(X,Y),6,PC:PAINT(X,Y),PC,PC
64Ø CY=CY+2Ø:IF CY=SY THEN 67Ø
65Ø PLAY SD$
66Ø PAINT(CX,CY),PC,3:GOTO64Ø
67Ø POKE65314,248:CX=X:CY=Y:REM
check--(SW)
68Ø CY=CY+2Ø:CX=CX-2Ø:IF CY=18ØO
RCX=ØTHEN74Ø
69Ø IF PPOINT(CX,CY)=3THEN74Ø
7ØØ IFPPOINT(CX,CY)<>PC THEN68Ø
ELSE SX=CX:SY=CY:CX=X:CY=Y:CIRCL
E(X,Y),6,PC:PAINT(X,Y),PC,PC
71Ø CX=CX-2Ø:CY=CY+2Ø:IF CX=SX A
ND CY=SY THEN 74Ø
72Ø PLAY SD$
73Ø PAINT(CX,CY),PC,3:GOTO71Ø
74Ø POKE65314,248:CX=X:CY=Y:REM
check--(W)
75Ø CX=CX-2Ø:IFCX=ØTHEN81Ø
76Ø IFPPOINT(CX,CY)=3THEN81Ø
77Ø IFPPOINT(CX,CY)<>PC THEN75Ø
ELSE SX=CX:SY=CY:CX=X:CY=Y:CIRCL
E(X,Y),6,PC:PAINT(X,Y),PC,PC
78Ø CX=CX-2Ø:IF CX=SX THEN81Ø
79Ø PLAY SD$
8ØØ PAINT(CX,CY),PC,3:GOTO78Ø
81Ø POKE65314,248:CX=X:CY=Y:REM
check--(NW)
82Ø CX=CX-2Ø:CY=CY-2Ø:IFCX=ØORCY
=ØTHEN88Ø
83Ø IFPPOINT(CX,CY)=3THEN88Ø
84Ø IFPPOINT(CX,CY)<>PC THEN 82Ø
ELSE SX=CX:SY=CY:CX=X:CY=Y:CIRCL
E(X,Y),6,PC:PAINT(X,Y),PC,PC
85Ø CX=CX-2Ø:CY=CY-2Ø:IF CX=SX A
ND CY=SY THEN88Ø
86Ø PLAY SD$
87Ø PAINT(CX,CY),PC,3:GOTO85Ø
```

```
88Ø PLAYSD$:IF PC=1THENPC=4:GOTO
16ØELSEPC=1:GOTO16Ø
89Ø REM CHECK NUMBER OF PIECES
9ØØ BS=Ø:WS=Ø:FORW=2ØTO16ØSTEP2Ø
:FORV=2ØTO16ØSTEP2Ø:IFPPOINT(W,V
)=1THENBS=BS+1ELSEIFPPOINT(W,V)=
4THENWS=WS+1
91Ø NEXT:NEXT
92Ø BS$=STR$(BS):WS$=STR$(WS):BS
$=RIGHT$(BS$,LEN(BS$)-1):WS$=RIG
HT$(WS$,LEN(WS$)-1)
93Ø DRAW"C2":LINE(2ØØ,64)-(23Ø,7
2),PSET,BF:LINE(2ØØ,1Ø4)-(23Ø,11
2),PSET,BF:L=LEN(BS$):IFL=2THEND
RAW"BM212,65;C1;"ELSEDRAW"BM214,
65;C1;"
94Ø V1=VAL(LEFT$(BS$,1)):IF V1=Ø
 THEN GOSUB 1Ø6Ø ELSE ON V1 GOSU
B 1Ø7Ø,1Ø8Ø,1Ø9Ø,11ØØ,111Ø,112Ø,
113Ø,114Ø,115Ø
95Ø IF L=2 THEN V1=VAL(RIGHT$(BS
$,1)):IF V1=Ø THEN GOSUB 1Ø6Ø EL
SE ON V1 GOSUB 1Ø7Ø,1Ø8Ø,1Ø9Ø,11
ØØ,111Ø,112Ø,113Ø,114Ø,115Ø
96Ø L=LEN(WS$):IF L=2THENDRAW"BM
212,1Ø5;C1;"ELSEDRAW"BM214,1Ø5;C
1;"
97Ø V1=VAL(LEFT$(WS$,1)):IF V1=Ø
 THEN GOSUB 1Ø6Ø ELSEON V1 GOSUB
 1Ø7Ø,1Ø8Ø,1Ø9Ø,11ØØ,111Ø,112Ø,1
13Ø,114Ø,115Ø
98Ø IF L=2 THEN V1=VAL(RIGHT$(WS
$,1)):IF V1=Ø THEN GOSUB 1Ø6Ø EL
SE ON V1 GOSUB 1Ø7Ø,1Ø8Ø,1Ø9Ø,11
ØØ,111Ø,112Ø,113Ø,114Ø,115Ø
99Ø RETURN
1ØØØ REM end of game
1Ø1Ø CLS:SOUND1,1Ø:FORT=1TO5ØØØ:
NEXT
1Ø2Ø PRINT@64," ******* F L I P
  I T ********":PRINT@128,"BLACK
 HAS";BS:PRINT@192,"WHITE HAS";W
S
1Ø3Ø IF WS>BS THEN S$="WHITE"ELS
E IF WS<BS THEN S$="BLACK"
1Ø4Ø IF WS=BS THEN PRINT@256,"
 IT'S A TIE GAME."ELSE PRINT@256
,"   ";S$;" IS THE WINNER."
1Ø5Ø PRINT@32Ø,"ANOTHER GAME";:I
NPUTI$:IFLEFT$(I$,1)="Y"THENRUNE
LSEIFLEFT$(I$,1)="N"THENENDELSE1
Ø5Ø
1Ø6Ø DRAW"R4D6L4U6R4BR4":RETURN
1Ø7Ø DRAW"D6BR4BU6":RETURN
1Ø8Ø DRAW"R4D3L4D3R4BU6BR4":RETU
RN
1Ø9Ø DRAW"R4D3NL4D3NL4BR4BU6":RE
TURN
11ØØ DRAW"D3R4U3ND6BR4":RETURN
111Ø DRAW"NR4D3R4D3NL4BU6BR4":RE
TURN
112Ø DRAW"NR4D6R4U3NL4BU3BR4":RE
TURN
113Ø DRAW"R4ND6BR4":RETURN
114Ø DRAW"R4D6L4U6D3R4U3BR4":RET
URN
115Ø DRAW"R4D3L4NU3BD3R4U6BR4":R
ETURN
```

One-Liner Contest Winner . . .

Has anyone told you to go fly a kite lately? If so, key in this program and fly one indoors.

The listing:

```
54 PMODE3:SCREEN1,Ø:FORX=192TO6Ø
STEP-2:PCLS:DRAW"BM"+STR$(X)+",1
6ØS16C2E2NF2ULNHRUEHGFDR2C3E12C3
BD3E3H3G3F5S8C4R4NFL4GD4FC3R4NEC
4NR4GD4FR4EU4NHD4C3R4NFL4GD4FR4N
EC4NR4GD4FR4EU4H":NEXT:FORR=1TO8
ØSTEP1:Y=82:K=RND(4):CIRCLE(12Ø,
Y+R),85,K,1,.5,.99:NEXT:RUN
```

Edward R. Gehrke
Nassau, NY

(For this winning one-liner contest entry, the author has been sent copies of both *The Third Rainbow Book of Adventures* and its companion *The Third Rainbow Adventures Tape.*)

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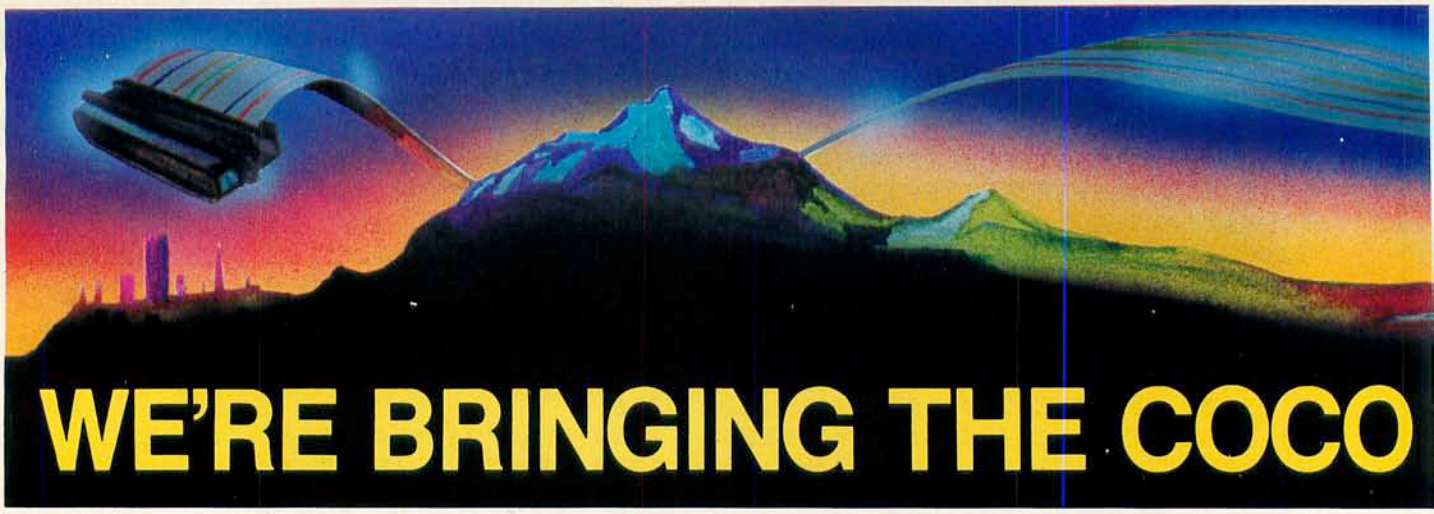
(SINCE 1985)



WE'RE BRINGING THE COCO

RAINBOW'S BROADENING ITS SPECTRUM

THE RAINBOW and the Delphi Information Utility have joined together to allow CoCo owners all over the world to connect with one another!

Delphi is a full-service information utility. It offers everything from up-to-the-minute news stories from The Associated Press to electronic mail services. But, *best of all*, it now has **a special forum for Color Computer owners, and it's operated by the people who bring you THE RAINBOW each month.**

The CoCo Special Interest Group (SIG) features a variety of services, including an open forum where you can send and receive messages from Color Computer owners all over the world. It also has several databases to which you can upload your favorite programs and from which you can download programs written by other CoCo enthusiasts. Some of these databases are BASIC programming, OS-9 and home applications.

When setting up your account with Delphi, if you do not have a credit card or prefer not to use it, Delphi requires that you send $25 to give your account a positive balance. This will be refunded after your first free hour if you choose to no longer use the system or it will be applied to future connect charges. If you do not maintain a positive balance, you will be charged $3.50 each month for direct billing.

PEEK INTO THE RAINBOW

The CoCo SIG's conference feature allows you to meet electronically with other members of the CoCo Community. You can join conferences with notables such as Dale Puckett, Cray Augsburg, Marty Goodman, Don Hutchison, Jim Reed, Lonnie Falk and others — on a regular basis. Conference schedules will appear in THE RAINBOW each month. Be sure to check online announcements for changes and additions.

THE OTHER SIDE OF THE RAINBOW

On Delphi, you also are able to buy RAINBOW ON TAPE — order a whole set, or download an individual program immediately. You can also renew your RAINBOW subscription, make a fast and easy order for software or hardware from a multitude of vendors, or inquire about products on the CoCo SIG.

We also have a number of **programs that you can download** and use, just for the cost of the time you spend transferring them. There'll also be **corrections for RAINBOW articles**, helpful hints and many other useful features.

FREE LIFETIME MEMBERSHIP

THE RAINBOW is offering subscribers a free lifetime subscription to Delphi — a $24.95 value — and a free hour of connect time — a $7.20 value at either 300, 1200 or 2400 Baud — so you can sample Delphi and the RAINBOW CoCo SIG. That's right. Your subscription to THE RAINBOW entitles you to this $32.15 value as a ***free bonus!***

If you're not a RAINBOW subscriber, just enter your order when you sign on with Delphi and you'll get the same great deal! For our $31 subscription fee, you'll get the finest Color Computer magazine ever, a free lifetime subscription to Delphi and a free hour of connect time.

SAVE EVEN MORE

Want to save even more? While you're online you can order, for only $29.95, a deluxe package which includes the Delphi membership, the *Delphi Handbook and Command Card* ($21.95) and a total of three hours of connect time ($21.60).

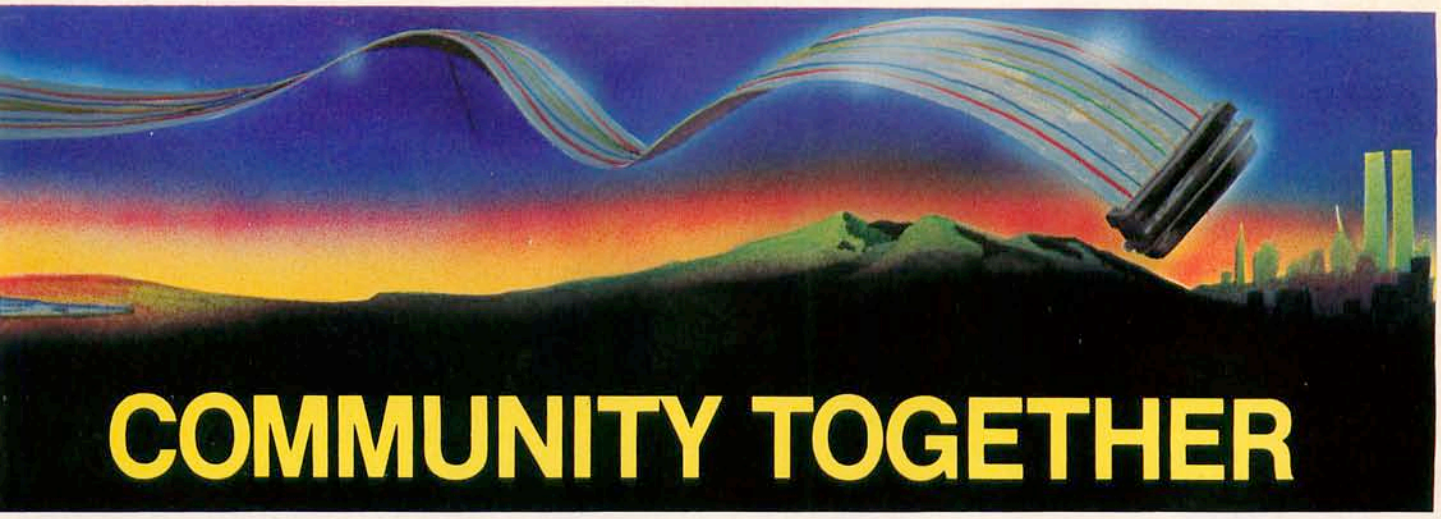
Delphi provides us all with **Immediate CoCo Community**. Check it out today. After all, you can sample it for free!

Problems? Call Delphi:

(800) 544-4005

(617) 491-3393

DELPHI TYPE: GROUP COCO



COMMUNITY TOGETHER

How to reach RAINBOW's Color Computer SIG . . .

There are several ways to connect to Delphi and THE RAINBOW's CoCo SIG. In most cities you will not even have to pay long distance charges; you can use special data communications networks like Telenet, Tymnet and the Canadian Datapac network.

First, set your terminal program to operate at either 300 or 1200 Baud (depending on the modem you have), and also select either 7 bits with even parity or 8 bits with no parity, and one stop bit. (If one combination doesn't work, try another.)

Decide which network you should use. There is no surcharge for Telenet or Tymnet. Canadian residents using Datapac will be charged an additional $10.80 (U.S.) per hour.

On Telenet: Uninet network has merged with Telenet. To get the Telenet number for your area, call (800) 336-0437. After you call the local access number and make connection, press ENTER twice. When the "TERMINAL=" prompt appears, press ENTER again. When the "@" prompt appears, type C DELPHI and press ENTER.

On Tymnet: Call (800) 336-0149 to get the Tymnet number for your area. After you dial your designated number and connect, you will see either "garbage" or a message saying "please type your terminal identifier." At this point, even if the screen is garbled, simply press 'A'. When "please log in:" appears, type DELPHI and press ENTER.

From Canada (on Datapac): Call Delphi Customer Service at (617) 491-3393 to get the Datapac number for your area. After you connect, press the period key (.) and ENTER (use two periods if you're using 1200 Baud). Type SET 2:1, 3:126 and press ENTER. Now type p 1 3106, DELPHI; and press ENTER. Delphi's new rates indicate an additional $10.80 hourly surcharge for evening use of Datapac, which means a total of $18 (U.S.) for connect time.

From other countries: Many countries have their own data networks that can connect to either Telenet or Tymnet. Check with the telephone authorities in your country for details on how to sign up for this service. When you have an account set up, you can reach Delphi with a "host code" of 3110 6170 3088 through Telenet, or 3106 90 6015 through Tymnet. (You'll have to pay the toll charges for this connection.)

Type in Your Username

If you're already a subscriber to THE RAINBOW, at the "USERNAME:" prompt, type JOINDELPHI and press ENTER. At the "PASSWORD:" prompt, type RAINBOW. Then, at the "NUMBER:" prompt, type your individual subscription number from the mailing label of your latest issue of THE RAINBOW. (If there are one or more zeros at the beginning of this number, include them.)

If you don't already have a subscription, at the "USERNAME:" prompt, type JOINDELPHI and press ENTER. At the "PASSWORD:" prompt, type SENDRAINBOW and press ENTER. Have your MasterCard, VISA or American Express card ready, because you'll be led through a series of questions that will enable us to put your RAINBOW and Delphi subscriptions into effect. In an effort to hold down non-editorial costs, we do not bill for subscriptions.

If you make a typing error, just use Control-X and start over. Remember that at any point, when you're on Delphi, you can type HELP to get help on how to use the system. To get off the system just type BYE.

If you find that you're unable to log on to Delphi and enter the CoCo SIG after following these instructions, call us during afternoon business hours at (502) 228-4492. We'll be glad to offer assistance.

Come Visit Us! Type: GROUP COCO

After you sign in, you'll be prompted to set up your own, personal "user name" — Delphi is a friendly service, no numbers to remember — and you'll be asked a number of questions so Delphi can set up your account. You'll also be assigned a temporary password.

Delphi will tell you that your account will be ready after 6 p.m. the same day if you sign up before noon (Eastern time zone.) If not, your account will be ready at 6 p.m. the next day. Once an account is verified and opened, *each RAINBOW subscriber will be credited with an hour of free time!*

When you log back in, use your chosen username and your temporary password to access the system. At that point, you will meet Max, who will help you configure things and will change your temporary password into your own *personal* password. This is the password you will use for subsequent sessions — or until you change it.

After Max bids you goodbye, you'll wind up at the Delphi Main Menu; type in GROUP COCO and **join us on the CoCo SIG!**

Ye Olde Font

By Bill Bernico

I am sure most of you have worked with or at least have seen some of the print font styles used in the commercial graphics editors that are on the market today. Have you ever wished you could use just the font part of that program in your own BASIC program? Up until now you couldn't, with the exception of some standard fonts that have appeared in RAINBOW the past few years.

In the July '84 issue (Page 82), Peter Stumpf showed us how to put graphics characters on the screen to spell out messages. It works great, but in its present form it uses up a lot of variable names and requires quite a few lines to spell out even short messages. That's because you have to join many strings together in order to spell out words.

In the procedure presented here, all the characters are stored in A$(32) through A$(122) with the exception of 91-96, since they are seldom used. This procedure works for any of the many font styles since the character-string numbers are the same for each set. They will always be labeled 32-122 to match the ASCII number for that character.

In this sample A$ contains the message you want to draw on the graphics screen. Lines 1020 through 1060 (the "core" of the program) do the actual drawing of the pre-defined string. Each time you want to spell out a message you have to do three things: Store your message in A$, define where that message will be drawn, and GOSUB to the drawing routine, in this case Line 1020.

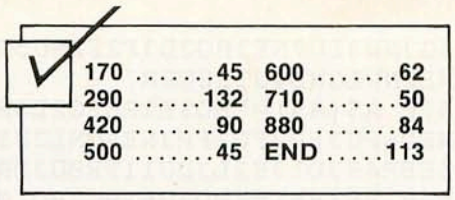
You may delete my lines 890 through 1010. They are merely samples of how this print font will look on the screen. Substitute your own message using the three-step procedure.

I keep this particular program on a disk in my collection marked "Programming Aids and Tools." Whenever I need a shortcut to get me through a programming procedure, I simply reach for this disk. It also contains a dozen or more other font styles that I have converted to DRAW strings.

Anyone wanting copies of these programs can send me a 22-cent stamp for a paper listing. For disk or tape, send $1.39 in stamps.

(Questions or comments about this program may be directed to the author at 708 Michigan Ave., Sheboygan, WI 53081. Please enclose an SASE when writing for a response.) □

Bill Bernico is the author of over 200 Color Computer programs and is a frequent RAINBOW contributor whose hobbies include golf, writing music and programming. Bill is a drummer in a rock band and lives in Sheboygan, Wisconsin.



170	45	600	62
290	132	710	50
420	90	880	84
500	45	END	113

The listing: SCRNFONT

```
10 'ENGLISH PRINT FONT
20 'FROM KROMICO SOFTWARE
30 'BY BILL BERNICO
40 '
50 DIM A$(122)
60 PMODE4,1:PCLS1:SCREEN1,1:COLO
R0,1
70 A$(32)="BR8
80 A$(33)="BR2G2RED8BD2D2HR2HBU2
U3LU3R2D3U5FBU2BR2
90 A$(34)="BRBUGDRND2RULBR3DRND2
RULUBR3
100 A$(35)="BR7G2D6LDU6L2GR3D3L3
GR3ND2R4UNL2D3EU5NL3UL2NUR3UD5R2
EL3U3R3EL3U2EBR5
110 A$(36)="BR5DND15G4D4RNU4E3R3
D6LNU6DLDL3HL2NDE2GR2DR2U10RFURU
NL3EBUBR3
120 A$(37)="BR4LG3DED2ED2EDE3LEL
2EL2EBR6G2RDLD2HD3HD3HD3HD2UBR6R
EL3EL2ELE3DED2ED3EUBU7BR2
130 A$(38)="BR6RF2NG3L2UL2G2RGDE
DRND3G2NR3G3RGDERGDERGD2EURE3H2R
2D2F5REUGLNH4UH4E2R2D2RENL5BU8BR
3
140 A$(39)="BRD4UHR2UL2BUBR5
150 A$(40)="BR6G4REG3REG3R2UG2ND
5RD7RU4D5RU3FDBU16BR3
160 A$(41)="BD17E4LGE3LGE3LGUE2D
HENU3LNU5HNU5UHU3GDBU2BR7
170 A$(42)="BR3D3ND3NL3NR3NG2NH2
NF2E2BUBR3
180 A$(43)="BR5BD4D4ND4NL4LND5NU
3DL4R8UL3R4BU8BR3
190 A$(44)="BRBD13D3GE2UL2RBU14B
R5
200 A$(45)="BD9NR6ER6BU8BR3
210 A$(46)="BD15R2GU2BU14BR5
220 A$(47)="BD16E2LELE2DHE2DHE2D
HE2DHE2DHE2BR3
230 A$(48)="BR4G3D8UHU4E4NR2DNR3
FNR3FR2GR2D4LU4D6G3UNE3L2H2EDRDR
BU12BR8
240 A$(49)="BD2E2ND13GR2UD13H2R4
GE2BU11BR3
250 A$(50)="BD4E4L2D3HUR2ER2DRND
5FD3NG3LNG7LG5D3GUENR6FNR4FR2E2H
REBU10BR3
260 A$(51)="BR3G3NF2RE2RNG3DRF2D
HD2HD4H2ED2R2D4ENU2G4H3LE2D2ED2E
D2EBU13BR6
270 A$(52)="BR6D14FU14LG6DR8FL8R
6D3FDEBU13BR3
280 A$(53)="BR9G3L4U2R5GL4D6E3RG
2RERGR2FND3L3FRD3G3LHNR3HNR5HLR4
H2GRBU10BR10
290 A$(54)="BR5F2RGH2LF2DH2LG2D9
HNU6UE5D2EUD3EUND5FD3G5U3LU3BU11
BR9
300 A$(55)="BD3E2R7GNL7G2RG2RG2E
RG3ERG2ERG2D2FU3ED4E2LBU13BR6
310 A$(56)="BDBR6L3G3R2DL2FRED3H
R3HD2R3HD3HR3ND3GD3G2NH4L2UR2NH4
L3ULULUE8L2DEUL2UBR6
320 A$(57)="BUBR4G4D3FNU4EUD3RU2
FE4ND5GD6G2NL5G2HRU2L2EBU7BR4R2U
H2LF2LNH2LHU2BR7
330 A$(58)="BD7R2GU2BD6D2HR2BU13
BR4
340 A$(59)="BD7R2HD2BD4D3GE2UL2B
U13BR6
350 A$(61)="BD6R6EL6BD3R6GNL6BU9
BR5
360 A$(63)="BR3G3ER4HLD2R3DL2FRG
4DBD2D2HR2BU13BR6
370 A$(65)="BD6U3NE2RE3NR3DR4G3L
2DEUR3EG2DGDG2NH3NR7DNR7G2NR3DNR
4DFBR3HR2E3D3FNE2U14GND9E2BR3
380 A$(66)="BD3UEDRUR3EG3D4L2GDE
R2D5LG2NDE2REU9FED8EU8EDER3GR2D2
```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```
HD2G2HUND9D2R3ND5FD4LG2L5GE3R3DL
3BU13BR8
39Ø A$(67)="BDBR4G3RG2ND4RD6FNU4
RNU2ED2NR4UR6NE2NUL3U12G3D6EU6ER
5GLU2LUBR6
4ØØ A$(68)="BDBR2NR7FR8GR2GRD2NL
2D3NL2D3GNL6GL6GE3U1ØG3D7G2E3U2L
3GE2R2U4E2R2D5RGD2RGDBU11BR7
41Ø A$(69)="BR4G3ND8RG2D4RED4RNU
2FNU2NR4ER5NE2NUL3U12G3D6EU6ENR7
ER2D2R3G4R4UNL3BU5BR3
42Ø A$(7Ø)="BD6E2DR3UL2EU2D14L2G
R2ERURUHU11R7NUL2UL3ED13GU8R3EL4
U4BUBR8
43Ø A$(71)="BD6D4FDU8E3D9G2U2D3N
R7ERD2R4HU12L2ND8R5HD2R2GR2G4R4H
LD2R2ND3LD3G2BU13BR6
44Ø A$(72)="BD3UNR5ER5EG4D9GRENU
9FRNU11EU11E2NRG2D4RE3D2END9RD7G
2LEBU13BR5
45Ø A$(73)="BD3URUR2D12L2GDR2UEU
11EBR3G2D12L2DRE2U12EBR3
46Ø A$(74)="BD5BRRUL2U2E2R3DL4R6
DL3R5LG3D9GL3G2ER3DRUR3U2RU1ØED9
BL3DU9E2RERBUBR3
47Ø A$(75)="BD3E2R3NEGL2FD8G2LGE
5DU8BR2NE2D8G3R4HLD2FURE3D2FU2FR
DH4LF2EH2E3LEL3GE2RBU3BR6
48Ø A$(76)="BD2E2R4EG2NL4D11L2G2
ERENU9RNE3R2F2RNE3HRNE2UE2LHBL3N
U7FU7EBU3BR7
49Ø A$(77)="BR6LG4D11LUREU5L2UR2
U4ERD11NG2U5R6D5EG3H2R3GNU12HU6L
NR5RU5LHR2DR6H2GRGND5R2DR2D12NEH
U11E2BUBR3
5ØØ A$(78)="BD3E2D2R3H2D14L3NDER
2EU1ØRED11NG2U4E3R4GDGDGDGDR4EG2
L2U2RHEUEUEU3L3FRU2L3G3E4RL5E2RG
R2BUBR7
51Ø A$(79)="BR9L4G5ND6RD8R8LGL4U
2LUE2NU8LU7ER6FL3HGD1ØUE3R3DG3RE
U5FUL3NG2RE2DHULBU3BR6
52Ø A$(8Ø)="BUBD3E3D2LR2HD2LR2ND
14GND13DG3R2GRDFGLNG2DR2D4R3U3NU
13R4GU2L3R5EL2E2DNU7HU2L2G3FRLHE
3REUL3NGR2EU2GU2GL2E2NDBR8
53Ø A$(81)="BR8L3G5ND6RD8R1ØGR2E
GHL3GL4UHUF2R2NU13R2E4G2DEU9L3HR
3D2LFNG3DERD4L3G3UBL3NU8EU8EBR11
54Ø A$(82)="BD14E5U8EG2L2GE2RD1Ø
G2E3FG2R5G2HRU2LUENU8ENE4F4DNE3H
2R3H3LNF3UE2U4L4E2D3FR2UL2U2BUBR
8
55Ø A$(83)="BR11G6H3UE2R3D2REL6G
F3NR6L2HG2DED2ED2NR7ENR5RE2L2R8G
R2ND3GD3G3UGU4RNDG5L3HU2R7DH2RL5
R2UBU1ØBR13
56Ø A$(84)="BD3E2DE2NR5DR9EG2L5D
6G3NU3LU7NE3RG2D3F2E2NU5G2NR2DR8
NE2NULGNL4U12BUBR7
57Ø A$(85)="BD3E2R6EG2L6R4G4ND4R
NED6FU3FD2FU2FR3NE4GNL2U13G2D6GU
5EBR4E3D13E2L3DU11FRBU3BR4
58Ø A$(86)="BD3UE2RG2RD1ØNLENU11
D2F2NE6H2R3GUHRUNE3U3NE3U6H2BR7N
G3D9ENL3U3NL3U3NL2UHBR4
59Ø A$(87)="BD3E3D14H2RU9LE2RFD1
2GU3FRE2U1ØGE2D14HUF2DU3RD2NE4U1
3BR2UED11EU9HBR4
6ØØ A$(88)="BD3E3D4FU4LGR2D6L3ER
3U4D6GDG2ND2L3NDERFRBR4R4EG3REL2
U2LND2LU5R3GL3D3R2UL2U5EUE2LED3F
U3FDEBU2BR4
61Ø A$(89)="R3GRD1ØNG3LG2D2ED2NR
3ER4HR5DGBU3L2BU2RL4U1ØFRUD9UE3R
3D2G2LEURU4L3NGR4DU3GU2GU2GUL2BR
8
62Ø A$(9Ø)="BD3UE2D2LR8U2GNL7D2N
G5LG3L3R8L2GLDR3L8R4G2RERG3UGD2G
UR8GU2R2L7RER5EBU11BR3
63Ø A$(97)="BD6NE3F2G2D2F2U3HD2R
FUR3D2EL2NU9EU8NEL3F2DGNLEU3HBU3
BR6
64Ø A$(98)="RD12NLFNU13FU2FURENU
7RU6L2U2G3U6EBR7
65Ø A$(99)="BD6NE3RD5GR5EG2LGU3L
RU6E2D2ED2EBU5BR3
66Ø A$(1ØØ)="BFGDERGR2GR2G4ND4RD
5FU3FD3E3NU6LNGU5NE2ULURBU5BR5
67Ø A$(1Ø1)="BD7RNE3D4GRFNU6F2NE
3UEL2ELU2E4L3FU2LBU5BR6
68Ø A$(1Ø2)="BR3G2D12LR3GU9L2R4L
2U4EDED2EBU2BR3
69Ø A$(1Ø3)="BD17R5EL5E6D5L2EU2L
2GLEL2NU5EU4E3D2ED5EU4EBU4BR3
7ØØ A$(1Ø4)="BDFD13E2NL3HU1ØNE2D
6E4GDED9G3ERE2U9BU5BR3
71Ø A$(1Ø5)="BD6ED9FE2LGU9RHBU2U
RBUBR4
72Ø A$(1Ø6)="BD5ED2ED1ØGE2U8H2BU
2URBUBR4
73Ø A$(1Ø7)="BDFD12HR4G2U13NE2D6
E3R2FL3FRG4ER2GR2D4EUL2U3BU1ØBR5
74Ø A$(1Ø8)="BDFD11NL2DFELU13EBR
3
75Ø A$(1Ø9)="BD6UED1ØHF2ELU9FNRE
2D1ØFU1ØFNRE2D1ØRNE2U9FBU6BR3
76Ø A$(11Ø)="BD5NE2RED9FE2LGU9FN
E2RED2RU2D9FE2LGU8EBU4BR4
77Ø A$(111)="BD7NE4ND4RD5F2UHUF2
E2NU6LU4H2EDFU2BU4BR4
78Ø A$(112)="BD5E2D13LR2NFU5NL2U
7FE2D2ED9GH3R5DL3FE2U6BU5BR3
79Ø A$(113)="BD6NE3ND6RNE2D7FU2F
E2D5NGR2HU9FG2DU5L2EBU4BR6
8ØØ A$(114)="BD5NE2RED8HF3E2LGU2
```

```
GU8FE2D2ED3EUBU5BR3
81Ø A$(115)="BD13NE8R6GLU2NL3BR3
ENU2LU3LD2HL3EL2NU2EU2E2DR4GNL2E
2BU3BR3
82Ø A$(116)="BD4NE3RD9HR2D2EDNE2
HU1ØFRBU4BR4
83Ø A$(117)="BD5NE2RED8FNU9FU3FD
EF2E2L3FU1ØG2R3G2D5U8BU4BR6
84Ø A$(118)="BR3G3RDEUD1ØNLF2NE4
U2RL2ELU7BR4NHD7EU5BU5BR3
85Ø A$(119)="BR2G2D2RU3D12HF2EUG
U9FE2ND9FD8F2E2RGNHEU9NG3FND8BU4
BR3
86Ø A$(12Ø)="BD6E3DGRD2RU2D5G4U3
FRE2RD2RD2E3GLHUHUE4D2HLE2BU3BR3
87Ø A$(121)="BD5NE2RED1ØGDFR3EUG
BH3RNU1ØEDE4NU6LU5G2BU6BR6
88Ø A$(122)="BD7UE3D2ED2EDG4R4HL
D2R3DL2D2EL2DL2GDFR2EBU16BR5
89Ø A$="English Print Font":DRAW
"BM5,5":GOSUB 1Ø2Ø
9ØØ DRAW"BMØ,33R255
91Ø A$="ABCDEFGHIJKLM":DRAW"BMØ,
5Ø":GOSUB 1Ø2Ø
92Ø A$="NOPQRSTUVWXYZ":DRAW"BMØ,
7Ø":GOSUB 1Ø2Ø
93Ø A$="abcdefghijklm":DRAW"BMØ,
9Ø":GOSUB 1Ø2Ø
94Ø A$="nopqrstuvwxyz":DRAW"BMØ,
11Ø":GOSUB 1Ø2Ø
95Ø A$="*!#$%&'()+.,/-?=":DRAW"B
MØ,13Ø":GOSUB 1Ø2Ø
96Ø A$="Ø123456789:;":DRAW"BMØ,1
5Ø":GOSUB1Ø2Ø
97Ø FORX=1TO15ØØ:NEXT
98Ø PCLS1:A$="brought to you":DR
AW"BM5Ø,3Ø":GOSUB1Ø2Ø
99Ø A$="by Bill Bernico":DRAW"BM
45,55":GOSUB1Ø2Ø
1ØØØ A$="& Rainbow Magazine":DRA
W"BM2Ø,8Ø":GOSUB1Ø2Ø
1Ø1Ø FORX=1TO1ØØØ:NEXT:PCLS1:GOT
O88Ø
1Ø2Ø FOR X=1 TO LEN(A$)
1Ø3Ø Y=ASC(MID$(A$,X,1))
1Ø4Ø IF Y<Ø THEN Y=Ø
1Ø5Ø DRAW A$(Y)
1Ø6Ø NEXT:RETURN
```


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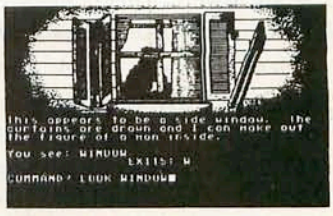

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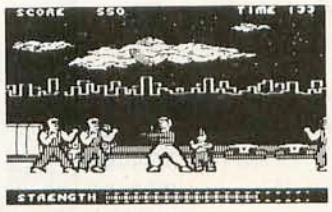

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(See software listed under B&B to right)

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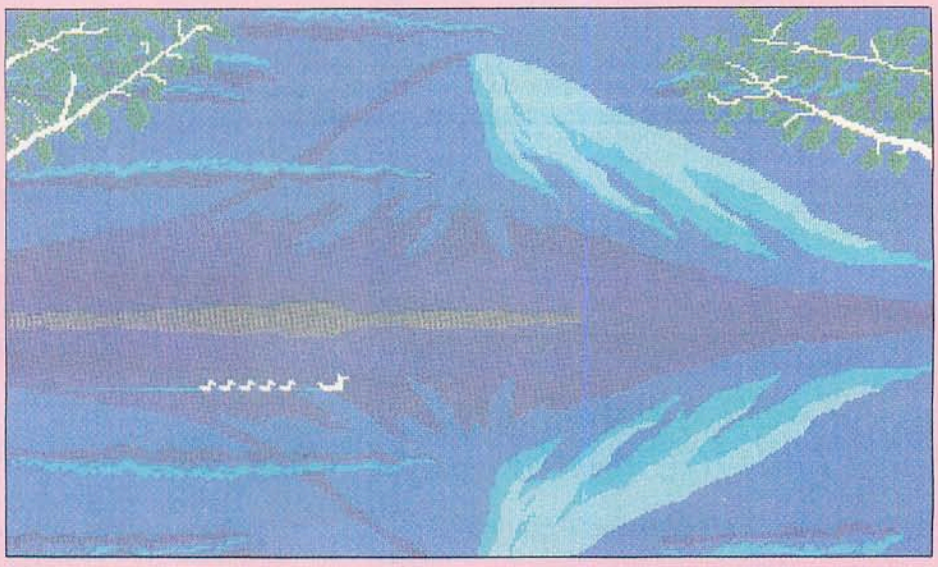
Dumping CoCo 3 graphics screens to the CGP-220

CoCo 3 Color Dump

By Duane M. Perkins

Viewed on an RGB monitor, the 16-color graphics from a CoCo 3 are truly impressive. Wouldn't it be nice if they could be printed in hard-copy form? Well, here are the programs you will need to dump those screens to a CGP-220 Color Ink Jet Printer.

You will need a machine language subroutine to generate output to the printer. Listing 1 is the printout from *EDTASM*. This code is included in the BASIC program in Listing 5. The parameter passed from BASIC is a pointer to a string descriptor. The string contains Hex codes for each of 16 permutations that are used to select the color of the pixels. Each pixel consists of a 2-by-2 array of four dots. Two diagonally opposite dots are printed with the color code from one of the Hex digits, and the other two dots are printed with the color code of the other Hex digit. Each Hex digit of the Hi-Res screen memory contains the palette slot number used to select the color for the dot on the screen that corresponds positionally to the Hex code in screen memory. When the screen is printed, each Hex digit is similarly used to select one of the 16 bytes in the color code string.



The subroutine does not print directly from the Hi-Res screen memory. The data must be moved to the upper 64K block, starting at `$4000`. After printing 15K, the subroutine returns to BASIC. Another 15K segment can then be printed. Two segments are required to print a full 16-color Hi-Res screen. This approach allows the flexibility of printing data from any source, not necessarily the Hi-Res screen memory. The BASIC program in Listing 2 generates the data to print color patches corresponding to each of the 64 permutations (see Figure 1). The ML code is in lines 410 through 430. The pokes in Line 70 modify the ML so that only 10 lines are printed on each call. After printing the patches, you can use the color chart to select codes for the color code string in Listing 5.

Listing 3 is a BASIC program to save a Hi-Res screen to four disk files; the first three are 8K and the last is 6K. The extension identifies the files sequentially from 0 to 3. Listing 4 is a BASIC program to load the four files and display the screen. Listing 5 is a program that will load and print the four files. The ML code is in lines 200 through 220.

You can use the program in Listing 6 to create pie charts. Set N (Line 10) to the number of slices and code DATA statements (replace lines 380 through 510) with the size, color and label of each slice. The size must be expressed as a fraction of the pie and the sum of

---

Duane M. Perkins retired as director of management information systems at the Panama Canal. His interests include electronics and computers, and he has had a number of articles published in Modern Electronics.

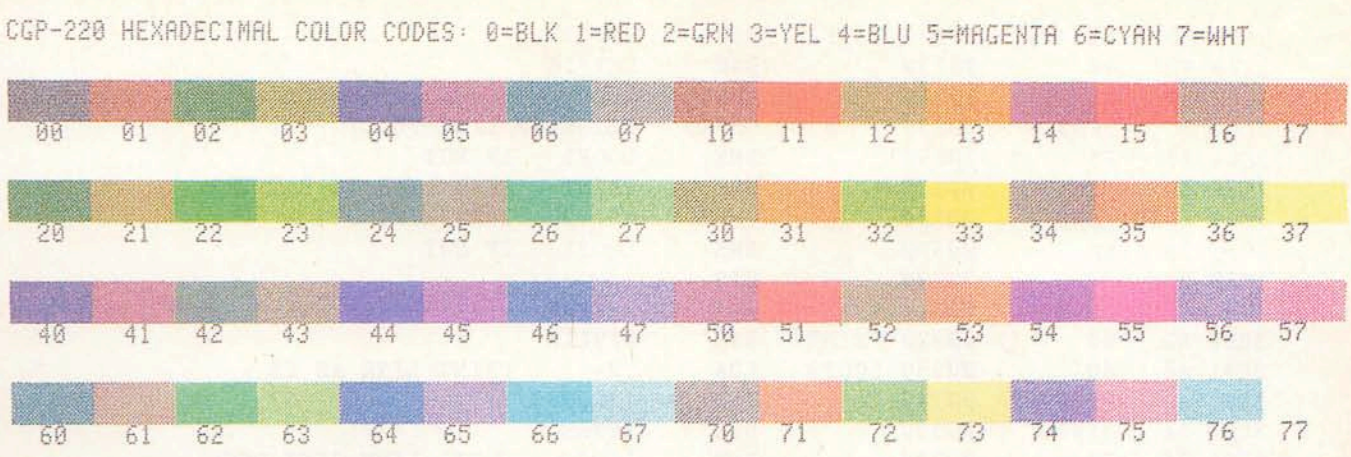


Figure 1: CGP-220 Color Codes

these should be unity. The color code must range from 0 to 15. The label may be up to eight characters in length. As shown in Figure 2, the colors of the slices are selected from palette slots 2 to 15; each is one-fourteenth of the pie. The background and foreground colors are selected from slots 0 and 1. When the chart is printed, the colors will be selected from the bytes in the color code string that correspond to the respective palette slots.

To use these programs, you must first create a screen using HSCREEN 2. Run the program in Listing 3 to save the screen. You can try different colors by using the PALETTE command and running the program in Listing 4. When you are satisfied, run the program in Listing 6 with the palette set up as it was for the screen to be printed. The screen will show a color wheel with the colors labeled in accordance with the palette slot numbers. Select a set of Hex codes from the printout of Listing 2 that you want to substitute for the colors on the screen. You can select the nearest match for each corresponding palette slot color or substitute any color you choose. Change Line 80 of Listing 5 accordingly and run the program. Keep in mind that the first two characters are the codes for the background and foreground, respectively.

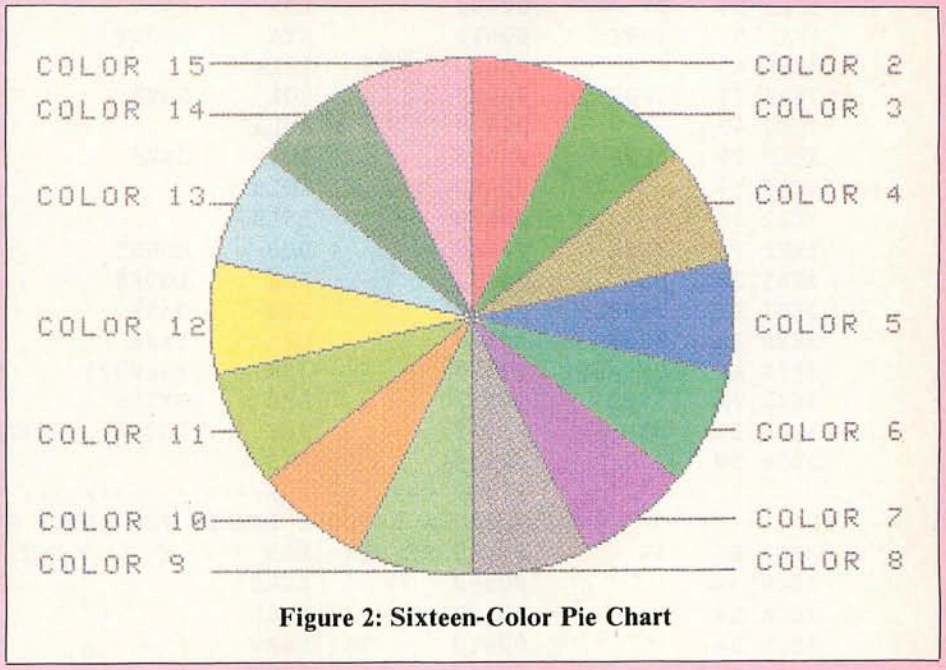


Figure 2: Sixteen-Color Pie Chart

(Questions or comments regarding these programs my be directed to the author at P.O. Box 255, Mt. Gretna, PA 17064. Please enclose an SASE when requesting a reply.) □

Listing 1:

```
                        ØØ1ØØ          TITLE   LISTING 1
                        ØØ11Ø * PRINT 4-DOT PIXELS
                        ØØ12Ø *-----------------------------------------------------
     3E69               ØØ13Ø          ORG     $3E69
     3E69 BD   B3ED     ØØ14Ø ENTER    JSR     $B3ED
     3E6C 1F   Ø1       ØØ15Ø          TFR     D,X
     3E6E EE   Ø2       ØØ16Ø          LDU     2,X     POINT TO COLOR CODE STRING
     3E7Ø 1Ø8E 4ØØØ     ØØ17Ø          LDY     #$4ØØØ  INPUT DATA
     3E74 86   FE       ØØ18Ø          LDA     #-2
     3E76 97   6F       ØØ19Ø          STA     $6F     OUTPUT TO PRINTER
                        ØØ2ØØ *-----------------------------------------------------
     3E78 8E   3F1Ø     ØØ21Ø LOOP1    LDX     #LINE
```

```
3E7B 8D   4A       ØØ22Ø LOOP2   BSR     SETPIX
3E7D 8D   48       ØØ23Ø         BSR     SETPIX
3E7F 3Ø   Ø1       ØØ24Ø         LEAX    1,X
3E81 8C   3F6Ø     ØØ25Ø         CMPX    #LINE+8Ø LINE FULL?
3E84 26   F5       ØØ26Ø         BNE     LOOP2   IF NOT
3E86 8D   Ø7       ØØ27Ø         BSR     PRINT   SEND LINE TO PRINTER
3E88 1Ø8C 7CØØ     ØØ28Ø         CMPY    #$7CØØ  15K PRINTED?
3E8C 26   EA       ØØ29Ø         BNE     LOOP1   IF NOT
3E8E 39            ØØ3ØØ         RTS
                   ØØ31Ø *-----------------------------------------------------
3E8F 8D   62       ØØ32Ø PRINT   BSR     NEWLIN
3E91 A6   8Ø       ØØ33Ø LOOP3   LDA     ,X+     PRINT LINE AS IS
3E93 AD   9F AØØ2  ØØ34Ø         JSR     [$AØØ2]
3E97 7A   3FØD     ØØ35Ø         DEC     BYTES
3E9A 26   F5       ØØ36Ø         BNE     LOOP3   UNTIL LINE SENT ONCE
3E9C 8D   55       ØØ37Ø         BSR     NEWLIN
3E9E A6   8Ø       ØØ38Ø LOOP4   LDA     ,X+     TRANSPOSE ADJACENT BITS
3EAØ B7   3FØF     ØØ39Ø         STA     SAVE
3EA3 86   Ø4       ØØ4ØØ         LDA     #4
3EA5 B7   3FØE     ØØ41Ø         STA     COUNT
3EA8 48            ØØ42Ø LOOP5   LSLA
3EA9 79   3FØF     ØØ43Ø         ROL     SAVE
3EAC 49            ØØ44Ø         ROLA
3EAD 79   3FØF     ØØ45Ø         ROL     SAVE
3EBØ 59            ØØ46Ø         ROLB
3EB1 58            ØØ47Ø         LSLB
3EB2 7A   3FØE     ØØ48Ø         DEC     COUNT
3EB5 26   F1       ØØ49Ø         BNE     LOOP5
3EB7 F7   3FØF     ØØ5ØØ         STB     SAVE
3EBA BA   3FØF     ØØ51Ø         ORA     SAVE
3EBD AD   9F AØØ2  ØØ52Ø         JSR     [$AØØ2]
3EC1 7A   3FØD     ØØ53Ø         DEC     BYTES
3EC4 26   D8       ØØ54Ø         BNE     LOOP4   UNTIL LINE SENT TWICE
3EC6 39            ØØ55Ø         RTS
                   ØØ56Ø *-----------------------------------------------------
                   ØØ57Ø * SETUP 2 PIXELS PER INPUT BYTE
3EC7 E6   A4       ØØ58Ø SETPIX  LDB     ,Y      GET LEFT HEX
3EC9 54            ØØ59Ø         LSRB
3ECA 54            ØØ6ØØ         LSRB
3ECB 54            ØØ61Ø         LSRB
3ECC 54            ØØ62Ø         LSRB
3ECD 8D   Ø7       ØØ63Ø         BSR     SETRGB  EVEN NUMBER PIXEL
3ECF E6   AØ       ØØ64Ø         LDB     ,Y+     GET RIGHT HEX
3ED1 C4   ØF       ØØ65Ø         ANDB    #$ØF
3ED3 8D   Ø1       ØØ66Ø         BSR     SETRGB  ODD NUMBER PIXEL
3ED5 39            ØØ67Ø         RTS
                   ØØ68Ø *-----------------------------------------------------
                   ØØ69Ø * SET RED, GRN & BLU BITS FOR ONE PIXEL
3ED6 A6   C5       ØØ7ØØ SETRGB  LDA     B,U     COLOR CODES
3ED8 48            ØØ71Ø         LSLA
3ED9 48            ØØ72Ø         LSLA
3EDA 69   89 ØØAØ  ØØ73Ø         ROL     16Ø,X   LEFT BLU
3EDE 48            ØØ74Ø         LSLA
3EDF 69   88 5Ø    ØØ75Ø         ROL     8Ø,X    LEFT GRN
3EE2 48            ØØ76Ø         LSLA
3EE3 69   84       ØØ77Ø         ROL     ,X      LEFT RED
3EE5 48            ØØ78Ø         LSLA
3EE6 48            ØØ79Ø         LSLA
3EE7 69   89 ØØAØ  ØØ8ØØ         ROL     16Ø,X   RIGHT BLU
```

```
3EEB 48            ØØ81Ø          LSLA
3EEC 69   88 5Ø    ØØ82Ø          ROL     8Ø,X    RIGHT GRN
3EEF 48            ØØ83Ø          LSLA
3EFØ 69   84       ØØ84Ø          ROL     ,X      RIGHT RED
3EF2 39            ØØ85Ø          RTS
                   ØØ86Ø *-------------------------------------------------
3EF3 C6   Ø3       ØØ87Ø NEWLIN   LDB     #3      START A NEW OUTPUT LINE
3EF5 8E   3FØA     ØØ88Ø          LDX     #MODE
3EF8 A6   8Ø       ØØ89Ø LOOP6    LDA     ,X+
3EFA AD   9F AØØ2  ØØ9ØØ          JSR     [$AØØ2]
3EFE 5A            ØØ91Ø          DECB
3EFF 26   F7       ØØ92Ø          BNE     LOOP6
3FØ1 86   FØ       ØØ93Ø          LDA     #24Ø
3FØ3 B7   3FØD     ØØ94Ø          STA     BYTES
3FØ6 8E   3F1Ø     ØØ95Ø          LDX     #LINE
3FØ9 39            ØØ96Ø          RTS
                   ØØ97Ø *-------------------------------------------------
3FØA      1B43     ØØ98Ø MODE     FDB     $1B43   COLOR SCAN MODE
3FØC      5Ø       ØØ99Ø          FCB     8Ø      ROWS PER LINE
3FØD               Ø1ØØØ BYTES    RMB     1
3FØE               Ø1Ø1Ø COUNT    RMB     1
3FØF               Ø1Ø2Ø SAVE     RMB     1
3F1Ø               Ø1Ø3Ø LINE     RMB     24Ø
                   Ø1Ø4Ø *-------------------------------------------------
          3E69     Ø1Ø5Ø          END     ENTER

ØØØØØ TOTAL ERRORS
```

Listing 2: COLORS

```
1Ø CLEAR 2ØØ,&H3E68
2Ø PRINT"PLEASE WAIT"
3Ø POKE &H96,&H12:'24ØØ BAUD
4Ø FOR A=&H3E69 TO &H3FØC
5Ø READ H$:POKE A,VAL("&H"+H$)
6Ø NEXT A
7Ø POKE &H3E8A,&H46:POKE &H3E8B,
&H4Ø
8Ø DEF USRØ=&H3E69
9Ø FOR A=16384 TO 17824 STEP 16Ø
1ØØ FOR C=Ø TO 15
11Ø FOR B=Ø TO 9
12Ø POKE A+B+1Ø*C,16*C+C
13Ø NEXT B:NEXT C:NEXT A
14Ø PRINT#-2,"CGP-22Ø HEXADECIMA
L COLOR CODES: Ø=BLK 1=RED 2=GRN
 3=YEL 4=BLU 5=MAGENTA 6=CYAN 7=
WHT"
15Ø C$="":FOR C=Ø TO 7
16Ø C$=C$+CHR$(C):NEXT C
17Ø FOR C=&H1Ø TO &H17
18Ø C$=C$+CHR$(C):NEXT C
19Ø X=USRØ(VARPTR(C$))
2ØØ PRINT#-2,"  ØØ    Ø1   Ø2
 Ø3    Ø4   Ø5    Ø6    Ø7    1Ø
   11    12    13   14    15
16   17"
```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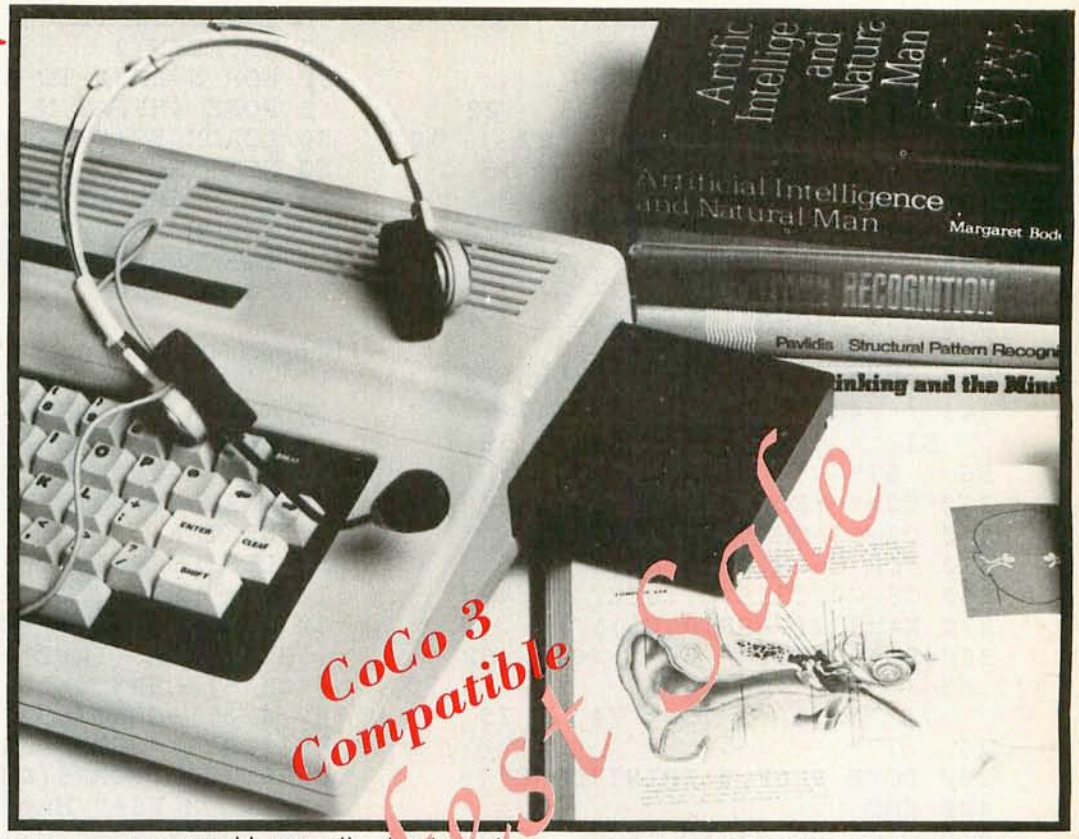

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```
21Ø C$="":FOR C=&H2Ø TO &H27
22Ø C$=C$+CHR$(C):NEXT C
23Ø FOR C=&H3Ø TO &H37
24Ø C$=C$+CHR$(C):NEXT C
25Ø X=USRØ(VARPTR(C$))
26Ø PRINT#-2,"  2Ø    21   22
 23    24   25    26    27    3Ø
   31    32    33   34    35
36   37"
27Ø C$="":FOR C=&H4Ø TO &H47
28Ø C$=C$+CHR$(C):NEXT C
29Ø FOR C=&H5Ø TO &H57
3ØØ C$=C$+CHR$(C):NEXT C
31Ø X=USRØ(VARPTR(C$))
32Ø PRINT#-2,"  4Ø    41   42
 43    44   45    46    47    5Ø
   51    52    53   54    55
56   57"
33Ø C$="":FOR C=&H6Ø TO &H67
34Ø C$=C$+CHR$(C):NEXT C
35Ø FOR C=&H7Ø TO &H77
36Ø C$=C$+CHR$(C):NEXT C
37Ø X=USRØ(VARPTR(C$))
38Ø PRINT#-2,"  6Ø    61   62
 63    64   65    66    67    7Ø
   71    72    73   74    75
76   77"
39Ø POKE &H6F,Ø:PRINT"DONE"
4ØØ END
41Ø DATA BD,B3,ED,1F,Ø1,EE,Ø2,1Ø
,8E,4Ø,ØØ,86,FE,97,6F,8E,3F,1Ø,8
D,4A,8D,48,3Ø,Ø1,8C,3F,6Ø,26,F5,
8D,Ø7,1Ø,8C,7C,ØØ,26,EA,39,8D,62
,A6,8Ø,AD,9F,AØ,Ø2,7A,3F,ØD,26,F
5,8D,55,A6,8Ø,B7,3F,ØF,86,Ø4,B7,
3F,ØE,48,79,3F,ØF,49,79,3F,ØF,59
,58,7A,3F,ØE,26,F1,F7,3F
42Ø DATA ØF,BA,3F,ØF,AD,9F,AØ,Ø2
,7A,3F,ØD,26,D8,39,E6,A4,54,54,5
4,54,8D,Ø7,E6,AØ,C4,ØF,8D,Ø1,39,
A6,C5,48,48,69,89,ØØ,AØ,48,69,88
,5Ø,48,69,84,48,48,69,89,ØØ,AØ,4
8,69,88,5Ø,48,69,84,39,C6,Ø3,8E,
3F,ØA,A6,8Ø,AD,9F,AØ,Ø2,5A,26,F7
,86,FØ,B7,3F,ØD,8E,3F,1Ø
43Ø DATA 39,1B,43,5Ø
```

Listing 3: HRSAVE

```
"
1Ø F$="HRESFILE"
2Ø FOR N=&H3Ø TO &H32
3Ø POKE &HFFA2,N
4Ø SAVEM F$+"/HR"+CHR$(N),&H4ØØØ
,&H5FFF,&H4ØØØ
5Ø NEXT N
6Ø POKE &HFFA2,&H33
7Ø SAVEM F$+"/HR3",&H4ØØØ,&H57FF
,&H4ØØØ
8Ø POKE &HFFA2,&H3A
```

Listing 4: HRLOAD

```
1Ø F$="HRESFILE"
2Ø HSCREEN 2
3Ø FOR N=&H3Ø TO &H32
4Ø POKE &HFFA2,N
5Ø LOADM F$+"/HR"+CHR$(N)
6Ø NEXT N
7Ø POKE &HFFA2,&H33
8Ø LOADM F$+"/HR3"
9Ø POKE &HFFA2,&H3A
1ØØ GOTO 1ØØ
```

Listing 5: CGPPRINT

```
1Ø CLEAR 2ØØ,&H3E68
2Ø POKE &H96,&H12:'24ØØ BAUD
3Ø FOR A=&H3E69 TO &H3FØC
4Ø READ H$:POKE A,VAL("&H"+H$)
5Ø NEXT A
6Ø DEF USRØ=&H3E69
7Ø F$="HRESFILE"
8Ø C$=CHR$(&H77)+CHR$(&HØØ)+CHR$
(&H15)+CHR$(&H22)+CHR$(&H3Ø)+CHR
$(&H46)+CHR$(&H26)+CHR$(&H54)+CH
R$(&HØ7)+CHR$(&H27)+CHR$(&H13)+C
HR$(&H23)+CHR$(&H33)+CHR$(&H76)+
CHR$(&HØ2)+CHR$(&H57)
9Ø LOADM F$+"/HRØ"
1ØØ LOADM F$+"/HR1",&H2ØØØ
11Ø X=USRØ(VARPTR(C$))
12Ø FOR A=&H4ØØØ TO &H43FF
13Ø POKE A,PEEK(A+&H3CØØ)
14Ø NEXT A
15Ø LOADM F$+"/HR2",&H4ØØ
16Ø LOADM F$+"/HR3",&H24ØØ
17Ø X=USRØ(VARPTR(C$))
18Ø POKE &H6F,Ø:PRINT"DONE"
19Ø END
2ØØ DATA BD,B3,ED,1F,Ø1,EE,Ø2,1Ø
,8E,4Ø,ØØ,86,FE,97,6F,8E,3F,1Ø,8
D,4A,8D,48,3Ø,Ø1,8C,3F,6Ø,26,F5,
8D,Ø7,1Ø,8C,7C,ØØ,26,EA,39,8D,62
,A6,8Ø,AD,9F,AØ,Ø2,7A,3F,ØD,26,F
5,8D,55,A6,8Ø,B7,3F,ØF,86,Ø4,B7,
3F,ØE,48,79,3F,ØF,49,79,3F,ØF,59
,58,7A,3F,ØE,26,F1,F7,3F
21Ø DATA ØF,BA,3F,ØF,AD,9F,AØ,Ø2
,7A,3F,ØD,26,D8,39,E6,A4,54,54,5
4,54,8D,Ø7,E6,AØ,C4,ØF,8D,Ø1,39,
A6,C5,48,48,69,89,ØØ,AØ,48,69,88
,5Ø,48,69,84,48,48,69,89,ØØ,AØ,4
8,69,88,5Ø,48,69,84,39,C6,Ø3,8E,
3F,ØA,A6,8Ø,AD,9F,AØ,Ø2,5A,26,F7
,86,FØ,B7,3F,ØD,8E,3F,1Ø
22Ø DATA 39,1B,43,5Ø
```

Listing 6: COLORPIE

```
1Ø N=14
```

```
2Ø DIM F(N),C(N),S$(N)
3Ø FOR I=1 TO N
4Ø READ F(I),C(I),S$(I)
5Ø NEXT I:Z=96:HSCREEN 2
6Ø FOR X=Ø TO 96
7Ø Y=INT(SQR(9216-X*X)+.5)
8Ø IF Y=Z OR Y=Z+1 THEN 14Ø
9Ø HSET(16Ø-X,96-Z)
1ØØ HSET(16Ø+X,96-Z)
11Ø HSET(16Ø-X,96+Z)
12Ø HSET(16Ø+X,96+Z)
13Ø Z=Z-1:GOTO 8Ø
14Ø HSET(16Ø-X,96-Y)
15Ø HSET(16Ø+X,96-Y)
16Ø HSET(16Ø-X,96+Y)
17Ø HSET(16Ø+X,96+Y)
18Ø Z=Y-1:NEXT X
19Ø HLINE(16Ø,Ø)-(16Ø,96),PSET
2ØØ FOR I=Ø TO N
21Ø B=A
22Ø A=A+6.28318*F(I)
23Ø AA=A:R=96:GOSUB 35Ø:S=SGN(X)
24Ø XX=16Ø+X:YY=96-Y
25Ø HLINE(16Ø,96)-(XX,YY),PSET
26Ø AA=A-(A-B)/2:R=48:GOSUB 35Ø
27Ø HPAINT(16Ø+X,96-Y),C(I),1
28Ø R=96:GOSUB 35Ø
29Ø HLINE(16Ø+X,96-Y)-(16Ø+SGN(X
)*96,96-Y),PSET
3ØØ X=Ø:Y=INT((96-Y)/8)
31Ø IF A<3.1416 THEN X=4Ø-LEN(S$
(I))
32Ø HPRINT(X,Y),S$(I)
33Ø NEXT I
34Ø GOTO 34Ø
35Ø X=INT(R*SIN(AA)+.5)
36Ø Y=INT(R*COS(AA)+.5)
37Ø RETURN
38Ø DATA .Ø7142857143,2,COLOR 2
39Ø DATA .Ø7142857143,3,COLOR 3
4ØØ DATA .Ø7142857143,4,COLOR 4
41Ø DATA .Ø7142857143,5,COLOR 5
42Ø DATA .Ø7142857143,6,COLOR 6
43Ø DATA .Ø7142857143,7,COLOR 7
44Ø DATA .Ø7142857143,8,COLOR 8
45Ø DATA .Ø7142857143,9,COLOR 9
46Ø DATA .Ø7142857143,1Ø,COLOR 1
Ø
47Ø DATA .Ø7142857143,11,COLOR 1
1
48Ø DATA .Ø7142857143,12,COLOR 1
2
49Ø DATA .Ø7142857143,13,COLOR 1
3
5ØØ DATA .Ø7142857143,14,COLOR 1
4
51Ø DATA .Ø7142857143,15,COLOR 1
5
```

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- Don't send us anything owned by someone else; this means no game screens, digitized images from TV programs or material that's already been submitted elsewhere. A digitized copy of a picture that appears in a book or magazine is ***not*** an original work.
- Along with your entry, send a cover letter with your name, address and phone number, detailing how you created your picture (what programs you used, etc.). Please include a few facts about yourself, too!
- Your name, address and phone number, along with the title of your work, must be clearly marked on the back of each entry, and a disk copy of each piece must also be included.
- Entries may be mailed to THE RAINBOW before May 1, 1988, or brought to the RAINBOWfest registration booth by 10 a.m., Saturday, May 21.
- Your work will be returned if sent with a postage paid return envelope, or entries can be picked up at the close of the show — Sunday, May 22, at 4 p.m.

There will be two categories: one for graphics produced on the CoCo 1 and 2, and one for CoCo 3 graphics. Several awards will be made in each category. Winners will be determined by votes from RAINBOWfest attendees. In case of any ties, winners will be determined by our chief judge, CoCo Cat.

Prizes and ribbons will be presented Sunday, May 22, and winning entries will be published in the September '88 issue of THE RAINBOW. Send your entry to "CoCo Gallery Live," THE RAINBOW, 9509 U.S. Highway 42, Prospect, KY 40059.

RAINBOWfest is the only computer show dedicated exclusively to yourTandy Color Computer.

Nowhere else will you see as many CoCo-related products or be able to attend free seminars conducted by the top Color Computer experts. It's like receiving the latest issue of THE RAINBOW in your mailbox!

RAINBOWfest is a **great opportunity** for commercial programmers **to show off new and innovative products for the first time. Chicago is the show** to get information on capabilities for the new CoCo 3, along with a terrific selection of the latest CoCo 3 software. In exhibit after exhibit, there will be demonstrations, opportunities to experiment with software and hardware, and special RAINBOWfest prices.

Set your own pace between visiting exhibits and attending the valuable, free seminars on all aspects of your CoCo — from improving BASIC skills to working with the sophisticated OS-9 operating system.

Many people who write for THE RAINBOW — as well as those who are written about — are there to meet you and answer questions. You'll also meet lots of other people who share your interest in the Color Computer. It's a person-to-person event and a tremendous learning experience in a fun and relaxed atmosphere.

A special feature of RAINBOWfest is the **Educational Sandbox**, which features **child-oriented workshops** to give hands-on experience to an age group often neglected. There are sessions for the kindergarten through third-graders, and for fourth- through seventh-graders. And, as an additional treat for CoCo Kids of all ages, we've invited frisky feline CoCo Cat to join us for the show. RAINBOWfest has something for everyone in the family!

If you missed the fun at our last RAINBOWfest in Princeton, why don't you make plans now to join us in Chicago? For members of the family who don't share your affinity for CoCo, there are many other attractions in the Chicago area.

The Hyatt Regency Woodfield offers special rates for RAINBOWfest. **The show opens Friday evening** with a session from 7 p.m. to 10 p.m. It's a daytime show Saturday — the CoCo Community Breakfast (separate tickets required) is at 8 a.m., then the exhibit hall opens promptly at 10 a.m. and runs until 6 p.m. On Sunday, the exhibit hall opens at 11 a.m. and closes at 4 p.m.

Tickets for RAINBOWfest may be obtained directly from THE RAINBOW. We'll also send you a reservation form so you can get a special room rate.

The POSH way to go. You can have your travel arrangements and hotel reservations handled through RAINBOW affiliate, POSH Travel Assistance, Inc., of Louisville. For the same POSH treatment many of our exhibitors enjoy, call POSH at (502) 893-3311. All POSH services are available at no charge to RAINBOWfest attendees.

BE THERE!

FREE SEMINARS

Rick Adams
Independent Programmer
Writing Commercial Software

Cray Augsburg
RAINBOW Technical Editor
OS-9 For Absolute Beginners

Bill Bernico
Independent Programmer
Writing in BASIC

Tom DiMarco, Sr.
Gimmesoft
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CoCo Consultations

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Glenside CoCo Club
Organizing a CoCo Club

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RAINBOW CoCo SIG Database Manager
Introduction to RAINBOW's CoCo SIG on Delphi

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Beginners Overview of OS-9
Beginners Overview of BASIC09

Logan Ward
Computer Center
Creative Uses for *CoCo Max*

Dick White
RAINBOW Contributing Editor
Spreadsheets for the CoCo

COCO COMMUNITY BREAKFAST

Dan Bruns — President, General Videotex Corporation

Our keynote speaker for the traditional CoCo Community Breakfast is Dan Bruns, president and chief executive officer of General Videotex Corporation (Delphi). Formerly a systems analyst for Sperry Univac, Mr. Bruns has helped Delphi grow into a major telecomputing information service and an important meeting place for the CoCo Community.

SPECIAL EVENT!

We're pleased to present The Educational Sandbox, a joint Tandy/RAINBOW effort. This is a computer workshop for RAINBOWfest kids. There will be two sessions on both Saturday and Sunday. One workshop will be for the kindergarten through third-grade set, and the other for fourth- through seventh-graders. Each workshop will last between 45 minutes and one hour, and will give the children and their parents hands-on experience in using Tandy computers and software.

RAINBOWfest - Chicago, Illinois
Dates: May 20-22, 1988
Hotel: Hyatt Regency Woodfield
Rooms: $64 per night, single or double
Advance Ticket Deadline: May 6, 1988

Join us at a future RAINBOWfest!

RAINBOWfest - Princeton, New Jersey
Dates: October 21-23, 1988
Hotel: Hyatt Regency Princeton
Rooms: $88 per night, single or double
Advance Ticket Deadline: Oct. 7, 1988

FREE T-Shirt to first five ticket orders received from each state.

First 500 ticket orders received get *The Rainbow Book of Simulations.*

YES, I'm coming to Chicago! I want to save by buying tickets now at the special advance sale price. Breakfast tickets require advance reservations.

Please send me:

____ Three-day tickets at $9 each total ____

____ One-day tickets at $7 each total ____
Circle one: Friday Saturday Sunday

____ Saturday CoCo Breakfast at $12 each total ____

____ RAINBOWfest T-shirts at $6 each total ____
(Advance sale-priced T-shirts must be picked up at the door)

Handling Charge $1 ____

TOTAL ENCLOSED ____

(U.S. Currency Only, Please)

☐ Also send me a hotel reservation card for the Hyatt Regency Woodfield ($64, single or double room).

Name ____
(please print)

Address ____

City ____ State ____

Telephone ____ ZIP ____

Company ____

☐ Payment Enclosed, or Charge to:

☐ VISA ☐ MasterCard ☐ American Express

Account Number ____

Exp. Date ____

Signature ____

Advance ticket deadline: May 6, 1988. Orders received less than two weeks prior to show opening will be held for you at the door. Tickets will also be available at the door at a slightly higher price. Tickets will be mailed six weeks prior to show. Children 4 and under, free; over 4, full price.

Make checks payable to: The RAINBOW. Mail to: RAINBOWfest, The Falsoft Building, 9509 U.S. Highway 42, P.O. Box 385, Prospect, KY 40059. To make reservations by phone, in Kentucky call (502) 228-4492, or outside Kentucky call (800) 847-0309.

By Jim Bennett

A graphics program called *Signature* makes it possible for you to use your CoCo to create an exact rendering of your signature, logo or similar design and then print it on paper. Designs may also be saved on disk or tape for future use in personalizing stationery or business forms.

Signature is very user-friendly. It demonstrates how PMODE4 graphics can be used to tremendous advantage and how to write a screen dump routine (the part of the program that tells your printer to print your signature). REM statements in the program listing help identify the various program parts as well as indicate specific lines of importance.

The program was written for a Radio Shack DMP-105 printer and should also run on the newer DMP-106. The screen dump can be modified for use with any printer that prints a standard seven-dot column. If you are unsure whether or not your printer prints a seven-dot column, refer to your printer operation manual.

The program is not very long and should not be difficult to key in. Nevertheless, you should use care to avoid typing mistakes, being especially careful to type lines 570 through 600 exactly as listed. Typographical errors in these lines will very likely produce FC Errors in Line 680, which relies on correct DATA statements to make the program run properly. Unlike easy-to-locate Syntax (SN) Errors, the source of a functional error can be very difficult to track down, since it most often will show up in a line that is error-free. Also take the precaution of saving the program before you attempt to run it the first time.

When you run the program, you should see the title written in script at the very top of the screen, a horizontal rectangle that is the writing space, and underneath, a menu of five options initiated by pressing the number keys 1 through 5. From the menu you may choose to write a signature, load a previously saved signature, save the one currently displayed in the writing space, print it, or erase it and start over again.

This program's method of writing text on the graphics screen will be familiar to experienced programmers. It is widely used; however, the version presented here is as short and simple as you'll find anywhere. In Line 610 the data for drawing the text characters is put into two arrays (numbers and letters). Then whenever it is necessary to put text on the screen, the program will first define the line of text together with the horizontal and vertical coordinates showing where the text should go (T$, H$, V$). Next it goes to the subroutine

Jim Bennett lives on the Hudson River in New York State with his wife and four children. He is deeply involved in education and owns E.Z. Friendly Software.

in lines 640 through 690, which uses the ASCII codes of the individual numbers and letters to draw the correct characters on the screen.

If you select Option 1 from the menu, the menu quickly disappears. In its place appears an impressive diagram of the keys used for writing. The commands that draw the diagram, as well as the title script, were created using the graphics utility, *Leonardo's Pencil*. The arrows in the diagram show the eight directions that the cursor can be moved when you press the keys, giving you precise control over the movement of the cursor. Holding down the ENTER key will cause the cursor to make a mark wherever it moves, pressing U for "undo" will erase previous marks, and pressing the M key will return you to the menu. Note, however, that you do not have to return to the menu to initiate options 2 through 5.

Observe how quickly the screen changes when you go from the menu to the writing option or back to the menu again. The technique for erasing the menu portion of the screen while leaving the writing space untouched is based on the fact that the writing space at the top takes up the first page of the PMODE4 graphics screen, while the area below it occupies pages 2 through 4. In order to erase the space quickly, a copy of the blank, lower three-quarters of the screen is first PCOPYed to graphics pages 5 through 7 (Line 30). Afterwards, the program simply PCOPYs pages 5 through 7 back to pages 2 through 4 (Line 880); in the blink of an eye, the area is erased!

If you have difficulty getting the cursor to write exactly the way you want (after all, using the keys isn't quite the same as "clicking your Bic!"), you might prefer the following technique for getting an exact rendering of your signature. Use a wax marking pen to write in the space directly on your monitor screen. This will serve as a guide that can be cleaned off after you are done. With a written guide in place, you can carefully trace underneath. Practice and you can become really proficient in using the keys to move the cursor exactly where you want it to go.

During the writing routine (lines 80 through 270), the program employs two methods of monitoring the keys that are pressed. The INKEY function checks the directional control keys and the M key. Two peeks, PEEK 338 and PEEK 343, are used to check the ENTER and U keys, respectively. The difference is that the INKEY function will recognize only once that a key has been pressed. It will not tell you if a key is being held down, nor will it recognize that more than one key is being pressed. By peeking at the locations in memory for the ENTER and U keys, it can be determined if they are being held down and also if they are being pressed simultaneously with another key.

Every time a mark is made, Line 150 pokes the horizontal and vertical coordinates of the cursor position into a location in high memory that was protected by a CLEAR command at the beginning of the program. These pokes create a record of what has been written so that when you want to "undo" something, the program can peek back into the record (Line 160) and erase the previous marks. Holding the U key will "undo" until you release the key.

The LOAD and SAVE options are easy and fast, because again we take advantage of the fact that the first page of the graphics screen covers the writing space. Therefore, it is necessary only to save and load the one page. This is a noticeable timesaver, especially when you are using tape.

When you are loading or saving, it is important to have the disk or tape ready. The program will automatically recognize in Line 900 the system being used by checking the amount of available memory (the tape system has more bytes of RAM than the disk system does) and then displaying the appropriate onscreen prompt, READY DISK or READY TAPE. If you are using a tape system, you will have to delete lines 760 and 805 from the program. Also remove the apostrophes at the beginnings of lines 770 and 860. This will cause the LOAD and SAVE routines to work with tape.

When you are asked to give the name of the signature you are loading or saving, type the name slowly; it will appear in the name box on the screen (the maximum length is eight letters). If you should make a mistake in spelling, use the left arrow to backspace. When the name is typed correctly, press ENTER and the option will execute.

Signature keeps the graphics screen in view during the entire running of the program. From the programming standpoint, it certainly would have been far easier to simply shift to the text screen during the LOAD and SAVE options. However, switching back and forth between graphics and text screens *does* give the program a really unfriendly appearance. For instance, if I had just spent a lot of effort creating a graphic and then suddenly saw it vanish before my eyes as the program changed to a text screen for the SAVE option, I would be at least a little concerned about the status of my graphic. To make things friendly (which in the case of a computer program means helpful, predictable and reassuring), routines in this program were designed to keep all the operations on the one screen.

If you select the print option, you will first be reminded to turn on the printer. Then you will be given a choice of five places, from left to right, where the signature can be printed on the paper. Once the placement is selected, the printer should begin working on the task of printing your signature.

The screen dump, contained in lines 290 through 460, is neither long nor especially complicated. Line 290 commands the printer to use condensed character and the graphics mode, to ready the print head, and to identify the last dot column on the page. Line 350 prints an appropriate number of blank spaces to position the signature properly. In lines 340 through 460 the routine uses two nested FOR-NEXT loops to scan the writing space horizontally and vertically. For each one-pixel horizontal advance, a vertical column of seven pixels is checked with the PPOINT function (lines 380 through 440).

The printer has a control code number for every one of the possible 127 combinations of dots in a column! By assigning the values of 1-2-4-8-16-32-64 to each of the seven positions, respectively, it is possible to represent all these combinations numerically. The sum of the dots in the column added to 128, the number for a blank column (no dots), will be the control code; this tells the printer the exact configuration to print. For example, CHR$(129) tells the printer to print only one dot in the top position (128+1); CHR$(192) tells the printer to print only one dot in the last position in the column (128+64).

Line 450 tells the printer to print a dot column duplicating the seven-pixel

column that has just been scanned. Line 460 uses a carriage return to advance to the next horizontal row.

When you look at how the screen dump works, it might appear that the printer is kept very busy printing little columns of dots on the paper one by one until the job is done. However, that is not the way the printer handles the job. Instead of printing the columns one at a time, it gathers a number of them together and prints them as a unit. So when the screen dump operates, the printer prints a section, pauses, prints another section, pauses again, and so on until the job is finished.

If you do not have a DMP-105 or DMP-106 but your printer does print a seven-dot column, it should not be too difficult to modify the screen dump to work with your printer. Simply use your printer operation manual to find out the six printer commands that are used in the screen dump routine (see Table 1). Also verify that your printer uses the same numbering system for naming the arrangement of dots in the columns. Then change the commands in the routine to fit your printer. Make absolutely certain to include all the necessary semicolons with your commands so you don't get unwanted carriage returns. Analyzing and modifying this routine should be extremely helpful in gaining an understanding of the graphics capabilities of the CoCo and your printer.

As stated at the beginning, *Signature* is a good example of how to make a program very user-friendly. Perhaps you can think of ways to add your own touches to this program to make it even friendlier. Perhaps you will be inspired to create more user-friendly programs of your own. There is no such thing as a program that can't be made friendlier, and the extra effort that is put into creating the program can take a lot of the effort out of using it.

(Questions or comments regarding this program may be directed to the author at Hutton and Orchard Sts., Rhinecliff, NY 12574. Please enclose an SASE when requesting a reply.) □

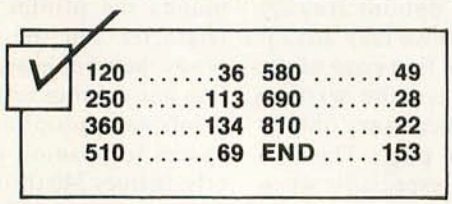
Variables

N$(0-9)	Numbers	V	Vertical position of cursor
L$(0-25)	Alphabet	L	Key pressed
C	Cursor	S	Blank spaces
CC	Location where H and V are poked	L$	Character in T$
H$	Horizontal location	N$	Name of signature
V$	Vertical location	D	Dot pattern
T$	Line of text		
H	Horizontal position of cursor		

Printer Commands

CHR$(27);CHR$(20)	Selects condensed character
CHR$(18)	Selects graphics mode
CHR$(27);CHR$(16)	Ready print head
CHR$(3);CHR$(31)	Specifies last dot column
CHR$(128-255)	Dot configuration in a column
PRINT#-2	Carriage return

Table 1



The listing: SIGNATUR

```
10 '****************************
 SIGNATURE BY JIM BENNETT, 1988
****************************
20 CLEAR500,22000:PCLEAR7:PMODE4
,1:PCLS0:SCREEN1,1:COLOR1:DIML$(
25),C(2,2):CC=22000:GOSUB560
30 LINE(4,17)-(251,49),PSET,B:LI
NE(6,19)-(249,47),PSET,BF:FORP=2
TO4:PCOPYP TOP+3:NEXTP:GOSUB470
40 H$="40":V$="80":T$="SELECT YO
UR OPTION":GOSUB640:LINE(38,82)-
(211,82),PSET:H$="96":V$="100":T
$="1 WRITE":GOSUB640:H$="92":V$=
"120":T$="2 LOAD":GOSUB640:V$="1
40":T$="3 SAVE":GOSUB640
50 V$="160":T$="4 PRINT":GOSUB64
0:V$="180":T$="5 ERASE":GOSUB640
60 I$=INKEY$:IFI$=""ORI$<"1"ORI$
>"5"THEN60ELSEIFI$="2"THEN710ELS
EIFI$="3"THEN800ELSEIFI$="4"THEN
280ELSEIFI$="5"THENGOSUB890:GOTO
60
70 '**********WRITE************
80 GOSUB880:H$="20":V$="100":T$=
"UNDO":GOSUB640:V$="120":T$="MEN
U":GOSUB640:GOSUB500
90 H=8:V=34
100 PUT(H,V)-(H+1,V+1),C,NOT:PUT
(H,V)-(H+1,V+1),C,NOT
110 I$=INKEY$:IFI$=""THEN100
120 L=INSTR("OP@L;,./",I$):IFL=0
ANDI$<>CHR$(13)ANDI$<>"M"ANDI$<>
"U"AND(I$<"2"ORI$>"5")THEN100
130 IFI$="2"THEN710ELSEIFI$="3"T
HEN800ELSEIFI$="4"THEN280ELSEIFI
$="5"THENGOSUB890:GOTO110:ELSEIF
I$="M"THENGOSUB880:GOTO40
140 ONL GOSUB200,210,220,230,240
,250,260,270
150 IFPEEK(338)<200THENCOLOR0:LI
NE(H,V)-(H+1,V+1),PSET,BF:POKECC
,H:POKECC+1,V:CC=CC+2:IFCC=32000
THENCC=22000
160 IFPEEK(343)=251ANDCC>22000TH
ENCOLOR1:H=PEEK(CC-2):V=PEEK(CC-
1):LINE(H,V)-(H+1,V+1),PSET,BF:C
C=CC-2:SOUND60,2:SOUND100,2:POKE
```

```
343,255
17Ø IFH<6THENH=6ELSEIFH>247THENH
=247
18Ø IFV<19THENV=19ELSEIFV>46THEN
V=46
19Ø GOTO1ØØ
2ØØ H=H-1:V=V-1:RETURN
21Ø V=V-1:RETURN
22Ø H=H+1:V=V-1:RETURN
23Ø H=H-1:RETURN
24Ø H=H+1:RETURN
25Ø H=H-1:V=V+1:RETURN
26Ø V=V+1:RETURN
27Ø H=H+1:V=V+1:RETURN
28Ø '******PRINT SIGNATURE******
285 GOSUB88Ø:H$="54":V$="1ØØ":T$
="TURN ON PRINTER":GOSUB64Ø:H$="
64":V$="12Ø":T$="PRESS ANY KEY":
GOSUB64Ø:EXEC44539
29Ø PRINT#-2,CHR$(27);CHR$(2Ø);C
HR$(18);CHR$(27);CHR$(16);CHR$(3
);CHR$(31);:'PRINTER CODES FOR
CONDENSED CHARACTER SET, GRAPH-
ICS MODE, READY PRINT HEAD, AND
SPECIFYING LAST DOT COLUMN
3ØØ GOSUB88Ø:H$="16":V$="8Ø":T$=
"SELECT POSITION ON PAPER":GOSUB
64Ø:H$="78":V$="1ØØ":T$="1 FAR L
EFT":GOSUB64Ø:H$="74":V$="12Ø":T
$="2 1/3 OVER":GOSUB64Ø:V$="14Ø"
:T$="3 CENTER":GOSUB64Ø
31Ø V$="16Ø":T$="4 2/3 OVER":GOS
UB64Ø:V$="18Ø":T$="5 FAR RIGHT":
GOSUB64Ø
32Ø I$=INKEY$:IFI$=""ORI$<"1"ORI
$>"5"THEN32ØELSES=133*(VAL(I$)-1
):SCREEN1,1:GOSUB88Ø:H$="26":V$=
"11Ø":T$="NOW PRINTING SIGNATURE
":GOSUB64Ø
33Ø PRINT#-2
34Ø FORV=19TO4ØSTEP7
35Ø FORX=ØTOS:PRINT#-2,CHR$(128)
;:NEXTX:'SPACING TO RIGHT
36Ø FORH=6TO248
37Ø D=128:'ADD UP DOTS IN COLUMN
38Ø IFPPOINT(H,V)=ØTHEND=D+1
39Ø IFPPOINT(H,V+1)=ØTHEND=D+2
4ØØ IFPPOINT(H,V+2)=ØTHEND=D+4
41Ø IFPPOINT(H,V+3)=ØTHEND=D+8
42Ø IFPPOINT(H,V+4)=ØTHEND=D+16
43Ø IFPPOINT(H,V+5)=ØTHEND=D+32
44Ø IFPPOINT(H,V+6)=ØTHEND=D+64
45Ø PRINT#-2,CHR$(D);
46Ø NEXTH:PRINT#-2:NEXTV:SCREEN1
,1:GOSUB88Ø:GOTO4Ø
47Ø '*******WRITE TITLE********
48Ø DRAW "BM51,14;S4C1BR2E3RERER
ERERERUEUEUHLGDGDFDFDFD2G2L3H2R9
ER2EREUEUBU2UBD5DGDGDFR3ERERERUE
UERER6BL2BG3BHBL4BD3BRD2RE2RERU
ED2GDGDGDG2L5HUBR2BE6BR6RE2R3DGD
GDGBE3E3RER2FDGDGD2R4ERERE2UE2R6
BL4BG3BLBGD3RERERE2UEDGDGD2R3ERE
RERERERERUEUEUEBLBG3
49Ø DRAW "BL3BGR12BL6BGBLBGBR2D2
GDGFR4ERERERUEUBGBD3GD2R4ERERU
EU2BGBD4DFR3ERERUEUEU2BD2FR4DGD
GF2R6ERERERUEUELHLGDG2D2F2R7ERER
2F2DG":RETURN
5ØØ '********DRAW KEYS**********
51Ø DRAW"BM86,75C1S4D23R27U23L27
BH2H9D7BU7R7BUBF12BDBF2BDL3G2D4F
2R2E2U4HBR29BUD19R28U23L28D4BFBR
5D8BEBU2UR3"
52Ø DRAW "E2UH2L4BRBE3BR4BU4U9G6
BR7BU5F4BR9BF6BR6BDBUBDD23R28U23
L27BF4BD7U5E2R4FD6GL3U4R2BRBE7BR
8BE4E9L7BF4BE3D6BLBG33BUBL38BDBG
4BLBG2BLL28D24R28U23BLBG2BL19D8R
5BRBL13BDBL3L1ØE5BEBG6F5BR49D7R2
9U24L29D17BE7BLBU5BRBUUD7BH3LR8B
G3BDBGBD2DBD3D2G2
53Ø DRAW "BR7BE1ØBR11R1ØG5BE5H5B
R9D17R52U23L52D6BF2BR5D6R4BU3L3B
U3R3BR4D6BRBU6F2DF3U6BR3R7BDBL3D
5BR1ØL4U3R4BL4U3R4BR3D6BEBU5R2FD
2GL2BRF2RBLBG17BL21BDL3ØD24R3ØU2
3BGBL22BG2BDDUE2R2F2D2G2LD2BD2DB
D5BG2E7BDBF9BRBF2BR5BFBR2F8BUU7B
```

```
**********************************************************
*                                                        *
*  ;;;;;;;;;  "ADDRESS"  ;;;;;                          *
*                                                        *
* FINALLY THERE IS A PROGRAM THAT WILL ALLOW YOUR PRINTER *
* TO ADDRESS ENVELOPES, (all standard sizes)!!! IT WILL  *
* INSTALL BOTH THE RETURN AND FORWARDING ADDRESSES ON TO *
* THE ENVELOPES AUTOMATICALLY IN ONE PASS AT THE PROPER  *
* POSITIONS FOR EACH!! BESIDES THE RETURN ADDRESS THE    *
* PROGRAM WILL HOLD AN ADDITIONAL 269 FORWARDING         *
* ADDRESSES PER DISK!! YOU CAN MAKE BACKUP COPIES OF THIS*
* PROGRAM THEREBY HAVING THE CAPACITY OF STORING AN      *
* UNLIMITED NUMBER OF ADDRESSES!! ALL ADDRESSES ARE      *
* SORTED ALPHABETICALLY AND AUTOMATICALLY AS YOU ENTER   *
* THEM!! THIS PROGRAM WILL SORT AND STORE ANY TYPE OF    *
* INFORMATION ON DISK THEREBY IT CAN SERVE AS A DATABASE *
* WITH EXTRAORDINARY CAPABILITIES!! THIS PROGRAM IS WORTH *
* MUCH MORE THAN WE ARE ASKING BUT WE WANT IT TO BE      *
* AFFORDABLE TO ALL!! DON'T MISS OUT ON A SUPER PROGRAM!! *
*     Each address you file can have a total of 8 lines  *
* of 64 characters each, totaling 512 characters per     *
* address! Addresses will never need this much storage   *
* space but other types of records may!!                 *
* IT WILL ALSO ADDRESS ALL STANDARD SIZES OF LABELS!!    *
* FULLY DOCUMENTED WHILE RUNNING + INSTRUCTION BOOKLET!! *
* 10 MENU DRIVEN ROUTINES TO FULLY AND COMPLETELY        *
* MANIPULATE YOUR ADDRESS FILES SUPERBLY!!               *
* SEE PRODUCT REVIEW IN THE MARCH/88 ISSUE OF RAINBOW!!  *
* REQUIRES: CoCo 3; Disk Drive; Printer; Monitor OR TV!  *
* $14.95 U.S. Funds + $3.00 S/H-ONT. residents add 7% tax *
* Visa; Money order or personalized check accepted.      *
**********************************************************
* COCO 3 WORD PROCESSOR for a DMP105 or DMP106 PRINTER   *
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**********************************************************
```

```
D8L8BL4ØBH7BU4U24
54Ø DRAW "L3ØD24R29BRBLBH21BL3F4
G4BD7BRDBDBF5BRBFBR2BUBD3D8E6BL6
BD6H5BL12BH7BL4U24L31D23UD2R3ØBH
2ØBUBLG5F4BD6DG2BG3BL3BG3G8U7BD7
R6BR"
55Ø RETURN
56Ø '******TEXT CHARACTERS******
57Ø DATA BUNFU2ERFD2GNLBR4,NU4BR
3,BU3ERFGLGDR3BR2,BU4R2FGNLFGNL2
BR3,BU2NE2R2NU2NRD2BR3,BU4NR2D2R
2FGNL2BR3,BUNFUNE2R2FGLBR4,BU4R3
G3DBR5,BRHEREHLGFRFGNLBR3,BU3NFE
RFDNLNG2BD2BR2
58Ø DATA U3ERFDNL3D2BR2,U4R2FGNL
2FGNL2BR3,BU4BR3L2GD2FR2BR2,U4R2
FD2GNL2BR3,BU4NR2D2NR2D2R2BR2,BU
4NR2D2NR2D2BR4,BU4BR3L2GD2FR2NU2
BR2,U2NU2R3NU2D2BR2
59Ø DATA BRNU4BR2,BR2BU4D3GLBR4,
U2NU2RNE2F2BR2,NU4R2BR2,U4F2NDE2
D4BR2,U4F3NU3DBR2,BUNFU2ERFD2GNL
BR3,U4R2FGNL2BD2BR3,BUNFU2ERFD2G
NLR2BR2,U4R2FGLNLF2BR2
6ØØ DATA BU4BR3L2GFRFGNL2BR3,BR2
U4NL2R2BD4BR2,BUNFU3BR3D3GNLBR3,
BU2NU2F2E2NU2BD2BR2,NU4E2F2NU4BR
2,UE3BL3F3DBR2,BU4F2NE2D2BR4,BU4
R3G3DR3BR2
61Ø FORX=ØTO9:READN$(X):NEXT:FOR
X=ØTO25:READL$(X):NEXT
62Ø RETURN
63Ø '********WRITE TEXT*********
64Ø DRAW"BM"+H$+","+V$+"C1S8":FO
RX=1TOLEN(T$)
65Ø L$=MID$(T$,X,1):IFL$=" "THEN
DRAW"BR4":GOTO69Ø
66Ø IFL$="/"THENDRAW"NE4BR6":GOT
O69Ø
67Ø IFL$<"A"THENDRAWN$(ASC(L$)-4
8):GOTO69Ø
68Ø DRAWL$(ASC(L$)-65)
69Ø NEXTX:RETURN
7ØØ '******LOAD ROUTINE*********
71Ø GOSUB88Ø:H$="58":V$="75":T$=
"LOAD SIGNATURE":GOSUB64Ø:LINE(5
6,78)-(192,78),PSET:GOSUB9ØØ:H$=
"18":V$="12Ø":T$="TYPE AND ENTER
 THE NAME":GOSUB64Ø:H$="72":N$="
":COLOR1:LINE(78,128)-(164,144),
PSET,B
72Ø I$=INKEY$:IFI$=""ORINSTR(CHR
$(13)+CHR$(8)+"123456789ØQWERTYU
IOPASDFGHJKLZXCVBNM/ ",I$)=ØTHEN
72ØELSEH$=STR$(VAL(H$)+1Ø):V$="1
4Ø":T$=I$
73Ø IFI$=CHR$(8)ANDN$<>""THENFOR
U=1TO1Ø:DRAW"BM"+H$+",14ØCØLNU4"
:H$=STR$(VAL(H$)-1):NEXTU:H$=STR
$(VAL(H$)-1Ø):N$=LEFT$(N$,LEN(N$
)-1):GOTO72Ø:ELSEIFI$=CHR$(8)THE
NH$=STR$(VAL(H$)-1Ø):GOTO72Ø:ELS
EIFI$=CHR$(13)THEN75Ø
74Ø IFLEN(N$)<8THENGOSUB64Ø:N$=N
$+I$:GOTO72Ø
75Ø 'LOADING
76Ø LOADMN$:'OMIT THIS LINE IF
USING TAPE
77Ø 'CLOADMN$:'DELETE THE FIRST
APOSTROPHE IF USING TAPE
78Ø GOSUB88Ø:GOTO4Ø
79Ø '******SAVE ROUTINE*********
8ØØ GOSUB88Ø:H$="58":V$="75":T$=
"SAVE SIGNATURE":GOSUB64Ø:LINE(5
6,78)-(192,78),PSET:GOSUB9ØØ:H$=
"18":V$="12Ø":T$="TYPE AND ENTER
 THE NAME":GOSUB64Ø:H$="72":N$="
":COLOR1:LINE(78,128)-(164,144),
PSET,B
81Ø I$=INKEY$:IFI$=""ORINSTR(CHR
$(13)+CHR$(8)+"123456789ØQWERTYU
IOPASDFGHJKLZXCVBNM/ ",I$)=ØTHEN
81ØELSEH$=STR$(VAL(H$)+1Ø):V$="1
4Ø":T$=I$
82Ø IFI$=CHR$(8)ANDN$<>""THENFOR
U=1TO1Ø:DRAW"BM"+H$+",14ØCØLNU4"
:H$=STR$(VAL(H$)-1):NEXTU:H$=STR
$(VAL(H$)-1Ø):N$=LEFT$(N$,LEN(N$
)-1):GOTO81Ø:ELSEIFI$=CHR$(8)THE
NH$=STR$(VAL(H$)-1Ø):GOTO81Ø:ELS
EIFI$=CHR$(13)THEN84Ø
83Ø IFLEN(N$)<8THENGOSUB64Ø:N$=N
$+I$:GOTO81Ø
84Ø 'SAVING
85Ø SAVEMN$,3584,5119,3584:'OMIT
THIS LINE IF USING TAPE
86Ø 'CSAVEMN$,1536,3Ø71,1536:'
DELETE FIRST APOSTROPHE IF USING
TAPE
87Ø GOSUB88Ø:GOTO4Ø
88Ø SOUND12Ø,1:FORP=5TO7:PCOPYP
TOP-3:NEXTP:RETURN:'ERASE
89Ø CC=22ØØØ:COLOR1:LINE(6,19)-(
249,47),PSET,BF:RETURN:'CLEAR
9ØØ H$="78":V$="1ØØ":IFMEM<2ØØØT
HENT$="READY DISK"ELSET$="READY
TAPE"
91Ø GOSUB64Ø:RETURN
```


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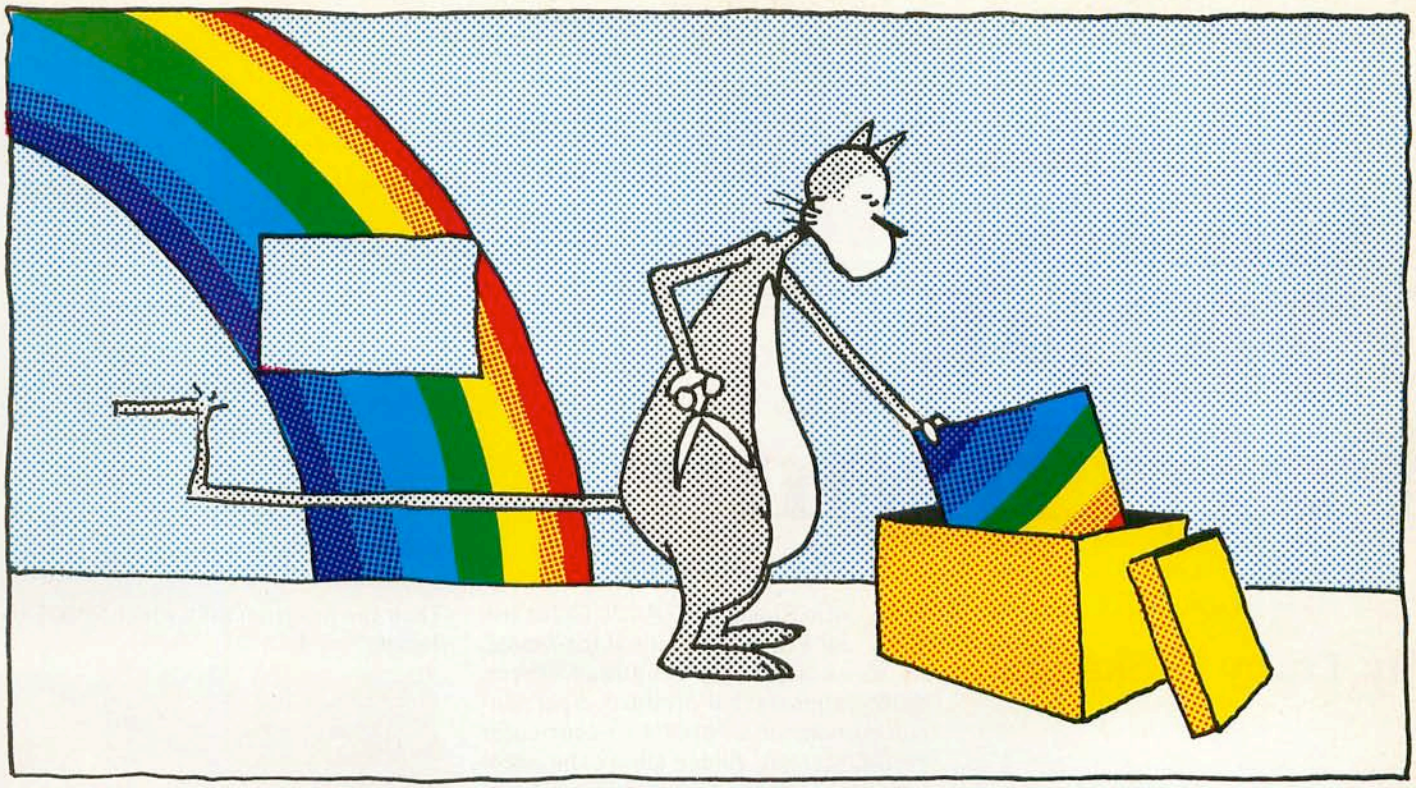

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Dump your PMODE 3 and 4 screens in color

PMODE Polychrome

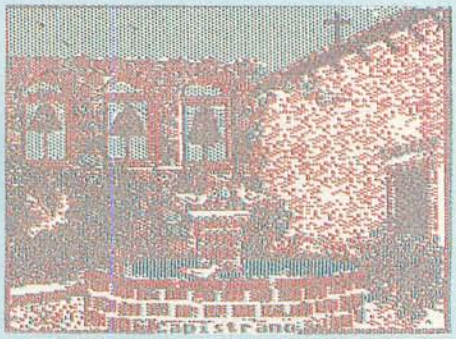
By Tracy L. Skaggs

Radio Shack's CGP-220 Color Ink Jet Printer is required for *Image*, an assembly language screen dump program that produces a pseudo-color image of a PMODE4 or four-color PMODE3 screen. *Image* allows the selection of a small or enlarged image to be printed, as well as the particular color translation from screen to printer.

Before running *Image*, be sure to clear enough space for it at the top of available RAM. For 32K this is CLEAR 200,&H7B2B, and for 16K it is CLEAR 200,&H3B2B (see the end of the article for particulars on modifying *Image* for 16K). When the program is executed (&H7BF6 for 32K and &H3BF6 for 16K), the title screen appears along with the question ENLARGE?. A response of Y will result in an enlarged dump, while a response of N prints a small image.

Tracy Skaggs, a junior computer science major, is a self-taught programmer who has enjoyed his CoCo for six years. His other interests include science fiction, stargazing and biking.

Then the program asks which PMODE to dump, 3 or 4.



If PMODE 4 is selected, the program asks if you want to translate even pixels (0,2,4,6,. . .) or odd pixels (1,3,5,7,. . .) as red, and if you want, set pixels on the screen to print as white (non-printing) or black (printing). If PMODE 3 is chosen, *Image* asks you to choose the printing colors for the four possible pixel values 0, 1, 2 and 3. Any combination of the eight printer colors is valid. Following these queries, *Image* begins to dump the screen; when that is finished, the program restarts.

Although fully documented, there are

To produce 8 dots of the 8 possible colors:

Red Data	0	1	0	1	0	1	0	1
Green Data	0	0	1	1	0	0	1	1
Blue Data	0	0	0	0	1	1	1	1
Produces	Black	Red	Green	Yellow	Blue	Magenta	Violet	White

Figure 1

some routines that may require more in-depth explanation. *Image* has 16 major routines listed in Table 1 along with a short description of what they do. While most of these are easily understood, six of them are less straightforward.

Routines

The routines PMOD3 and PMOD4 process the graphics screen, line by line, and dump the resulting data to the printer. The method used by the CGP-220, called the color-scan mode, is fairly simple. This mode is not much different from a normal dot-addressable graphics mode. However, instead of printing the data in a vertical column of seven or eight dots, it prints an eight-dot horizontal row. Also, when the mode is selected, a value is given indicating how many of these eight-dot rows are to be printed on one line. The color of each dot is determined by RGB color mixing, so for any one line consisting of 32 eight-dot rows, the printer requires 96 bytes to be sent: 32 bytes of red data, 32 bytes of green data and 32 bytes of blue data. Refer to Figure 1 to see how the eight different colors can be attained.

PMOD3 and PMOD4 scan the screen line and examine a pixel to determine what color it should print (a pixel is a group of bits: In PMODE 3 these groups are two bits wide and in PMODE 4 they are one bit wide). PMOD3 calculates the value of the current pixel (0-3) and calls the routine COLOR that determines the proper printer color for the pixel. PMOD4 does nearly the same thing, except it keeps track of whether the pixel is odd or even and if the last bit was set or reset. This is required to reproduce the color artifacting as seen on the screen: If the current pixel is odd and the previous bit was not set, it will print as red (or blue, depending on your selection). If the previous bit was set, then this pixel will print as white (or black, depending on your selection).

The routines SETCLR and COLOR are used by PMOD3 to produce the proper color for each of four possible pixel values. SETCLR is called to select the four colors corresponding to the pixel values. COLOR is called to do the actual setting of the values in the red, green and blue color buffers. To accomplish this, a series of tables is used. The first, CTABLE, holds four bytes having the values 0-7 corresponding to the eight available colors. The values act as an offset in the second table. This table, JTABLE, is simply eight addresses pointing to the eight color routines in lines 02400-02920.

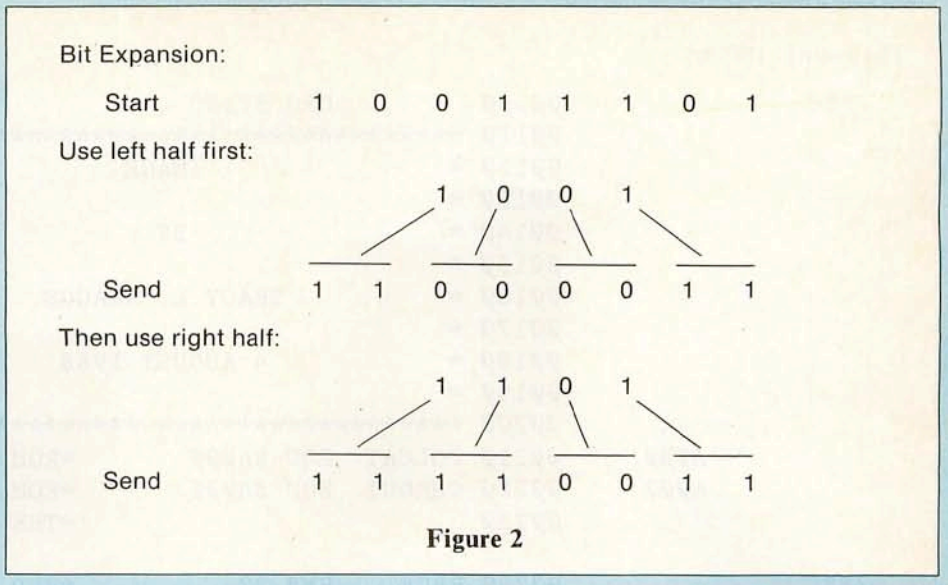


Figure 2

PSEUDO is the routine that asks what pixels, odd or even, will be printed red and whether to print set pixels as black or white. After getting a response, PSEUDO modifies PMOD4 in two places. MODIF1 and MODIF2 are given the address of the routine for black or white, and MODIFY is toggled between BEQ (if even is to be red) and BNE (if odd is to be red). Note that the artifact color blue is printed as violet in Line 01540. This is because the violet ink looks more like the artifact blue than the blue ink does. If you don't agree, change it.

Finally, ENLARG modifies the color data so that as it is sent to the printer, each separate bit is expanded into two bits. The method used here may not be the most eloquent, but it is the first one that worked. The routine expands first the left and then the right half of the byte. After each half is expanded, it is sent to the printer. See Figure 2.

Modifications

The assembly listing is shown assembled by Radio Shack's *EDTASM+* (as patched for disk in THE RAINBOW by Roger Schrag) for a 32K Disk ECB CoCo. However, to assemble it for 16K simply change the origination address at Line 00100 from $788C to $388C. If you do not have a disk system, you must change the start and end addresses for the graphics screen. These are in lines 00330 and 00340 and should be changed to $0600 and $1E00, respectively. To print graphics from another location, you can modify these addresses to point wherever you want.

(Questions or comments regarding this program may be directed to the author at 1815 East 5th St., Milan, IL 61264. Please enclose an SASE when requesting a reply.)

Table 1

START	Initializes baud rate (1=9600, 6=4800, 18=2400, 41=1200, 87=600, 180=300), screen output, and clears the screen.
TPAGE	Asks opening questions.
PMOD3	Dumps a PMODE 3 screen.
COLOR	Selects proper color.
PMOD4	Dumps a PMODE 4 screen.
SETX	Points X to the current byte in the color buffers.
POWERS	Generates the powers of 2 for bit manipulation.
BLACK, WHITE, RED, GREEN, BLUE, YELLOW MAGENTA, VIOLET	Color routines.
SETCLR	Asks how to translate colors to the printer.
DUMP0	Dumps the color buffers to the printer.
ENLARG	Enlarges bytes being sent to the printer if requested.
CLEAR0	Clears the contents of the color buffers of old data.
GRAFIX	Sends setup values to the printer for color scan mode.
PRINT	Prints a message beginning at X on the screen.
GETKEY	Gets a response from the keyboard, loops indefinitely until a response is given. □

The listing: IMAGE

```
7B8C                    00100          ORG $7B8C
                        00110 ****************************************
                        00120 *                IMAGE                 *
                        00130 *                                      *
                        00140 *                 BY                   *
                        00150 *                                      *
                        00160 *           TRACY L. SKAGGS            *
                        00170 *                                      *
                        00180 *            4 AUGUST 1986             *
                        00190 *                                      *
                        00200 ****************************************
              A000      00210 POLCAT   EQU $A000        *ROM ROUTINE TO POLE KEYBOARD
              A002      00220 CHROUT   EQU $A002        *ROM ROUTINE TO SEND REG. A TO
                        00230                           *THE DEVICE IN 'DEVNUM' ($006F)

7B8C                    00240 RBUF     RMB 32           *RED DATA BUFFER
7BAC                    00250 GBUF     RMB 32           *GREEN DATA BUFFER
7BCC                    00260 BBUF     RMB 32           *BLUE DATA BUFFER
7BEC          00        00270 ODEV     FCB 0            *SET FOR ODD PIXEL, RESET FOR E
VEN
7BED          00        00280 SETFLG   FCB 0            *SET IF LAST BIT WAS SET
7BEE          00        00290 VALUE    FCB 0            *VARIOUS
7BEF          00        00300 ENLRG    FCB 0            *IF SET, ENLARG PICTURE
7BF0          00        00310 BIT      FCB 0            *CURRENT BIT (0-7)
7BF1          00        00320 BYTE     FCB 0            *CURRENT BYTE (0-31)
7BF2          0E00      00330 PAGEST   FDB $0E00        *GRAPHICS PAGE START
7BF4          2600      00340 PAGEND   FDB $2600        *GRAPHICS PAGE END
7BF6 86       12        00350 START    LDA #18          *SET PRINTER OUTPUT
7BF8 97       96        00360          STA <$96         *TO 2400 BAUD
7BFA 0F       6F        00370          CLR <$6F         *SCREEN OUTPUT
7BFC BD       A928      00380          JSR $A928        *CLEAR SCREEN
7BFF 8E       7EAF      00390 TPAGE    LDX #TITLE       *GET TITLE MESSAGE
7C02 BD       7E9D      00400          JSR PRINT        *PRINT IT
7C05 8E       040E      00410 QUERY    LDX #$040E       *SET CURSOR POSITION
7C08 9F       88        00420          STX <$88         *FOR ENLARGE QUERY
7C0A 8E       7F1E      00430          LDX #QUERY1      *GET MESSAGE
7C0D BD       7E9D      00440          JSR PRINT        *PRINT IT
7C10 BD       7EA8      00450          JSR GETKEY       *WAIT FOR A RESPONSE
7C13 81       59        00460          CMPA #'Y         *WAS IT 'Y'
7C15 26       0A        00470          BNE NO           *NO, BRANCH
7C17 B7       7BEF      00480          STA ENLRG        *YES, SET FLAG
7C1A 86       40        00490          LDA #64          *AND SEND 64 ROWS IN GRAFIX SET
 UP
7C1C B7       7FEA      00500          STA PTABLE+2     *TO PRINTER
7C1F 20       0C        00510          BRA QURY1        *BRANCH TO PMODE QUERY
7C21 81       4E        00520 NO       CMPA #'N         *WAS IT 'N'?
7C23 26       E0        00530          BNE QUERY        *NO, TRY AGAIN
7C25 86       20        00540          LDA #32          *YES, SEND 32 ROWS IN GRAFIX SE
T UP
7C27 B7       7FEA      00550          STA PTABLE+2     *TO PRINTER
7C2A 7F       7BEF      00560          CLR ENLRG        *RESET FLAG
7C2D 8E       04F0      00570 QURY1    LDX #$04F0       *SET CURSOR POSITION FOR PMODE
7C30 9F       88        00580          STX <$88         *QUERY.
7C32 8E       7F28      00590          LDX #QUERY2      *GET MESSAGE
7C35 BD       7E9D      00600          JSR PRINT        *PRINT IT
7C38 BD       7EA8      00610 GET2     JSR GETKEY       *WAIT FOR A RESPONSE
```

```
7C3B 81   33     ØØ62Ø          CMPA #'3        *WAS IT '3'?
7C3D 27   Ø6     ØØ63Ø          BEQ PMOD3       *YES, DUMP A PMODE 3 SCREEN.
7C3F 81   34     ØØ64Ø          CMPA #'4        *WAS IT '4'?
7C41 26   F5     ØØ65Ø          BNE GET2        *NO, TRY AGAIN
7C43 2Ø   6E     ØØ66Ø          BRA PMOD4       *YES, DUMP A PMODE 4 SCREEN.
                 ØØ67Ø *
                 ØØ68Ø *ROUTINE TO DUMP PMODE 3
                 ØØ69Ø *COLOUR OUTPUT IS DETERMINED BY USER
                 ØØ7ØØ *CHOICE IN 'SETCLR'.
                 ØØ71Ø *
7C45 BD   7DE3   ØØ72Ø PMOD3    JSR SETCLR      *GET COLOUR CHOICES
7C48 17   Ø238   ØØ73Ø          LBSR CLEARØ     *CLEAR DATA BUFFERS
7C4B 7F   7BF1   ØØ74Ø          CLR BYTE        *CLEAR BYTE COUNT
7C4E 1ØBE 7BF2   ØØ75Ø          LDY PAGEST      *START OF GRAFIX SCREEN
7C52 A6   AØ     ØØ76Ø NEXTBT   LDA ,Y+         *GET NEXT BYTE OFF SCREEN
7C54 7F   7BFØ   ØØ77Ø          CLR BIT         *CLEAR BIT COUNT
7C57 7F   7BEE   ØØ78Ø ROLLIT   CLR VALUE       *CLEAR OUT 'VALUE'. WILL HOLD
                 ØØ79Ø                          *VALUE OF TWO BIT PIXEL
7C5A 48          ØØ8ØØ          LSLA            *SHIFT FIRST BIT OFF A INTO CAR
RY
7C5B 79   7BEE   ØØ81Ø          ROL VALUE       *ROLL IT INTO 'VALUE'
7C5E 48          ØØ82Ø          LSLA            *SHIFT THE SECOND
7C5F 79   7BEE   ØØ83Ø          ROL VALUE       *ROLL INTO 'VALUE'
7C62 8D   2E     ØØ84Ø          BSR COLOUR      *GO SET CORRESPONDING COLOUR
7C64 7C   7BFØ   ØØ85Ø          INC BIT         *ADD 1 TO BIT COUNT
7C67 F6   7BFØ   ØØ86Ø          LDB BIT         *CHECK COUNT
7C6A C1   Ø8     ØØ87Ø          CMPB #8         *LAST FOR THIS BYTE?
7C6C 25   E9     ØØ88Ø          BLO ROLLIT      *NO, LOOP TO ROLL AGAIN
```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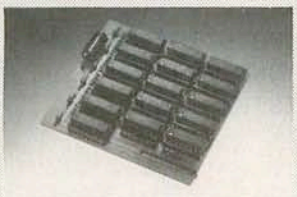

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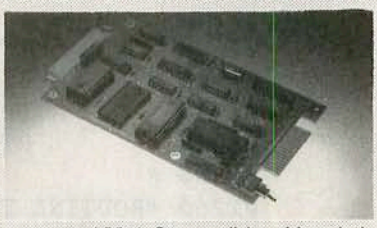

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```
7C6E 7C   7BF1    00890          INC BYTE        *YES, ADD 1 TO BYTE COUNT
7C71 F6   7BF1    00900          LDB BYTE        *CHECK COUNT
7C74 C1   20      00910          CMPB #$20       *LAST BYTE IN ROW?
7C76 25   DA      00920          BLO NEXTBT      *NO, GET NEXT BYTE
7C78 7F   7BF1    00930          CLR BYTE        *YES, CLEAR  BYTE COUNT
7C7B 7D   7BEF    00940          TST ENLRG       *TEST FOR LARGE PICTURE
7C7E 27   03      00950          BEQ WUNS        *IF NOT, SEND BUFFER ONCE
7C80 17   01AB    00960          LBSR DUMP0      *OTHERWISE SEND IT TWICE
7C83 17   01A8    00970 WUNS     LBSR DUMP0      *
7C86 17   01FA    00980          LBSR CLEAR0     *CLEAR DATA BUFFERS
7C89 10BC 7BF4    00990          CMPY PAGEND     *END OF SCREEN?
7C8D 25   C3      01000          BLO NEXTBT      *NO, GET NEXT BYTE.
7C8F 16   FF64    01010          LBRA START      *YES, RESTART.
                  01020 *
                  01030 *ROUTINE TO SET PROPER
                  01040 *COLOUR FROM 'VALUE' BASED
                  01050 *ON SELECTION TABLE.
                  01060 *
7C92 34   22      01070 COLOUR   PSHS Y,A        *SAVE REGISTERS
7C94 F6   7BEE    01080          LDB VALUE       *GET PIXEL VALUE (0-3)
7C97 8E   7FEC    01090          LDX #CTABLE     *GET SELECTION TABLE ADDRESS
7C9A 3A           01100          ABX             *ADD B'S OFFSET INTO IT
7C9B E6   84      01110          LDB ,X          *GET COLOUR NUMBER SELECTED
7C9D 8E   7FF0    01120          LDX #JTABLE     *POINT TO JUMP TABLE
7CA0 86   02      01130          LDA #2          *EACH ADDRESS IN TABLE
                  01140                          *IS TWO BYTES LONG.
7CA2 3D           01150          MUL             *MULTIPLY COLOUR # BY 2.
7CA3 3A           01160          ABX             *ADD THAT OFFSET INTO X.
7CA4 1F   12      01170          TFR X,Y         *X POINTS INDIRECTLY TO COLOUR
ROUTINE.
                  01180                          *SO PUT IT IN Y AND
7CA6 17   00E8    01190          LBSR SETX       *GO POINT X TO BUFFER BYTE
7CA9 AD   B4      01200          JSR [,Y]        *JUMP INDIRECTLY TO SET COLOUR.

7CAB 7C   7BF0    01210          INC BIT         *PIXELS ARE TWO BITS LONG SO
7CAE AD   B4      01220          JSR [,Y]        *DO THE NEXT ONE TOO.
7CB0 35   22      01230          PULS Y,A        *RECOVER REGISTERS AND
7CB2 39           01240          RTS             *RETURN.
                  01250 *
                  01260 *ROUTINE TO DUMP PMODE 4
                  01270 *WITH PSEUDO COLOURS.
                  01280 *
7CB3 8D   7C      01290 PMOD4    BSR PSEUDO      *SELECT EVEN OR ODD PIXELS RED
7CB5 17   01CB    01300          LBSR CLEAR0     *CLEAR BUFFERS
7CB8 7F   7BEC    01310          CLR ODEV        *RESET ODD/EVEN FLAG
7CBB 7F   7BED    01320          CLR SETFLG      *RESET LAST BIT FLAG
7CBE 7F   7BF1    01330          CLR BYTE        *CLEAR BYTE COUNTER
7CC1 10BE 7BF2    01340          LDY PAGEST      *START OF GRAFIX PAGE
7CC5 A6   A0      01350 NXTBYT   LDA ,Y+         *GET NEXT BYTE OFF SCREEN
7CC7 7F   7BF0    01360          CLR BIT         *CLEAR BIT COUNTER
7CCA 49           01370 ROLBIT   ROLA            *ROLL BIT OFF A INTO CARRY
7CCB 25   0B      01380          BCS NEXT        *BRANCH IF BIT WAS SET
7CCD 17   00C1    01390          LBSR SETX       *OTHERWISE POINT X INTO BUFFER
7CD0      BD      01400          FCB $BD         *OP CODE FOR 'JSR'
7CD1      0000    01410 MODIF1   FDB $0000       *ADDRESS OF BLACK/WHITE ROUTINE

7CD3 7F   7BED    01420          CLR SETFLG      *CLEAR BIT FLAG
```

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7CD6 2Ø   23     Ø143Ø        BRA LOOP      *GO FINISH PASS
7CD8 7D   7BED   Ø144Ø NEXT    TST SETFLG    *TEST LAST BIT FLAG
7CDB 27   Ø8     Ø145Ø        BEQ NEXT1     *BRANCH IF BIT WAS ZERO
7CDD 17   ØØB1   Ø146Ø        LBSR SETX     *OTHERWISE GO POINT X INTO BUFF
ER
7CEØ      BD     Ø147Ø        FCB $BD       *OP CODE FOR 'JSR'
7CE1      ØØØØ   Ø148Ø MODIF2  FDB $ØØØØ    *ADDRESS OF BLACK/WHITE ROUTINE

7CE3 2Ø   16     Ø149Ø        BRA LOOP      *FINISH PASS
7CE5 7C   7BED   Ø15ØØ NEXT1   INC SETFLG    *BIT WAS SET, SO SET THE FLAG
7CE8 7D   7BEC   Ø151Ø        TST ODEV      *TEST FOR ODD OR EVEN PIXEL
7CEB 27   Ø8     Ø152Ø MODIFY  BEQ NEXT2     *BRACH IF EVEN (RESET)
7CED 17   ØØA1   Ø153Ø        LBSR SETX     *OTHERWISE POINT X INTO BUFFER
7CFØ 17   ØØEB   Ø154Ø        LBSR VIOLET   *AND SET BIT TO VIOLET
7CF3 2Ø   Ø6     Ø155Ø        BRA LOOP      *FINISH PASS
7CF5 17   ØØ99   Ø156Ø NEXT2  LBSR SETX     *GO POINT X INTO BUFFER
7CF8 17   ØØB7   Ø157Ø        LBSR RED      *AND SET BIT TO RED.
7CFB F6   7BEC   Ø158Ø LOOP   LDB ODEV      *TOGGLE ODD/EVEN FLAG
7CFE C8   Ø1     Ø159Ø        EORB #1       *
7DØØ F7   7BEC   Ø16ØØ        STB ODEV      *
7DØ3 7C   7BFØ   Ø161Ø        INC BIT       *ADD 1 TO BIT COUNT
7DØ6 F6   7BFØ   Ø162Ø        LDB BIT       *CHECK COUNT
7DØ9 C1   Ø8     Ø163Ø        CMPB #8       *ARE WE FINISHED?
7DØB 25   BD     Ø164Ø        BLO ROLBIT    *NO, GO ROLL ANOTHER BIT
7DØD 7C   7BF1   Ø165Ø        INC BYTE      *YES, ADD 1 TO BYTE COUNT
7D1Ø F6   7BF1   Ø166Ø        LDB BYTE      *CHECK COUNT
7D13 C1   2Ø     Ø167Ø        CMPB #$2Ø     *ARE WE DONE WITH THIS LINE?
7D15 25   AE     Ø168Ø        BLO NXTBYT    *NO, GO GET ANOTHER BYTE
7D17 7F   7BF1   Ø169Ø        CLR BYTE      *YES, CLEAR BYTE COUNT
7D1A 7D   7BEF   Ø17ØØ        TST ENLRG     *SENDING A LARGE PICTURE?
7D1D 27   Ø3     Ø171Ø        BEQ ONCE      *NO, SEND DATA ONCE
7D1F 17   Ø1ØC   Ø172Ø        LBSR DUMPØ    *OTHERWISE SEND IT TWICE
7D22 17   Ø1Ø9   Ø173Ø ONCE   LBSR DUMPØ    *
7D25 17   Ø15B   Ø174Ø        LBSR CLEARØ   *SEND DATA BUFFER
7D28 1ØBC 7BF4   Ø175Ø        CMPY PAGEND   *DONE WITH SCREEN?
7D2C 25   97     Ø176Ø        BLO NXTBYT    *NO, GO GET NEXT BYTE
7D2E 16   FEC5   Ø177Ø        LBRA START    *YES, RESTART PROGRAMME.
                 Ø178Ø *
                 Ø179Ø *ROUTINE TO SELECT PSEUDO
                 Ø18ØØ *COLOUR OUTPUT.
                 Ø181Ø *
7D31 8E   Ø4EØ   Ø182Ø PSEUDO  LDX #$Ø4EØ    *CLEAR FROM X
7D34 CC   6Ø6Ø   Ø183Ø        LDD #$6Ø6Ø    *TO BOTTOM OF SCREEN
7D37 ED   81     Ø184Ø PSEUD1  STD ,X++
7D39 8C   Ø6ØØ   Ø185Ø        CMPX #$Ø6ØØ
7D3C 25   F9     Ø186Ø        BLO PSEUD1
7D3E 8E   Ø5ØØ   Ø187Ø        LDX #$5ØØ     *POINT X TO PSEUDO COLOUR MESSA
GE
7D41 9F   88     Ø188Ø        STX <$88
7D43 8E   7FB2   Ø189Ø        LDX #PMESS    *POINT X TO MESSAGE
7D46 BD   7E9D   Ø19ØØ        JSR PRINT     *PRINT IT
7D49 BD   7EA8   Ø191Ø PSEUD2  JSR GETKEY    *GET RESPONSE
7D4C 81   45     Ø192Ø        CMPA #'E      *WAS IT AN 'E'?
7D4E 27   ØB     Ø193Ø        BEQ PSEUD3    *BRANCH IF YES
7D5Ø 81   4F     Ø194Ø        CMPA #'O      *WAS IT AN 'O'?
7D52 26   F5     Ø195Ø        BNE PSEUD2    *NO, TRY AGAIN
7D54 86   26     Ø196Ø        LDA #$26      *YES, OP CODE FOR 'BNE'
```

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7D56 B7   7CEB    Ø197Ø          STA MODIFY      *
7D59 2Ø   Ø5      Ø198Ø          BRA PSOUT       *BRANCH OUT
7D5B 86   27      Ø199Ø PSEUD3   LDA #$27        *'BEQ' OP CODE
7D5D B7   7CEB    Ø2ØØØ          STA MODIFY      *
7D6Ø 8E   Ø52Ø    Ø2Ø1Ø PSOUT    LDX #$52Ø       *POINT X TO SCREEN POSITION
7D63 9F   88      Ø2Ø2Ø          STX <$88        *FOR BLACK/WHITE QUERY
7D65 8E   7FC7    Ø2Ø3Ø          LDX #BLKWHT     *GET MESSAGE ADDRESS
7D68 BD   7E9D    Ø2Ø4Ø          JSR PRINT       *PRINT IT
7D6B BD   7EA8    Ø2Ø5Ø CHKKEY   JSR GETKEY      *WAIT FOR RESPONSE
7D6E 81   42      Ø2Ø6Ø          CMPA #'B        *IS IT 'B'LACK?
7D7Ø 26   ØE      Ø2Ø7Ø          BNE CHKWHT      *NO, CHECK FOR 'W'
7D72 8E   7DAA    Ø2Ø8Ø          LDX #BLACK      *YES, GET BLACK ROUTINE ADDRESS

7D75 BF   7CE1    Ø2Ø9Ø          STX MODIF2      *MODIFY JUMP OPERAND
7D78 8E   7DAB    Ø21ØØ          LDX #WHITE      *GET WHITE ROUTINE ADDRESS
7D7B BF   7CD1    Ø211Ø          STX MODIF1      *MODIFY OTHER JUMP OPERAND
7D7E 2Ø   1Ø      Ø212Ø          BRA PSOUT2      *BRANCH OUT
7D8Ø 81   57      Ø213Ø CHKWHT   CMPA #'W        *IS IT 'W'HITE?
7D82 26   E7      Ø214Ø          BNE CHKKEY      *NO, TRY AGAIN
7D84 8E   7DAB    Ø215Ø          LDX #WHITE      *YES, GET WHITE ROUTINE ADDRESS

7D87 BF   7CE1    Ø216Ø          STX MODIF2      *MODIFY JUMP OPERAND
7D8A 8E   7DAA    Ø217Ø          LDX #BLACK      *GET BLACK ROUTINE ADDRESS
7D8D BF   7CD1    Ø218Ø          STX MODIF1      *MODIFY OTHER JUMP OPERAND
7D9Ø 39           Ø219Ø PSOUT2   RTS
                  Ø22ØØ *
                  Ø221Ø *ROUTINE TO POINT X INTO
                  Ø222Ø *GRAFIX DATA BUFFER
                  Ø223Ø *
7D91 8E   7B8C    Ø224Ø SETX     LDX #RBUF       *X AT BEGINNING OF BUFFER
7D94 F6   7BF1    Ø225Ø          LDB BYTE        *GET BYTE COUNT OFFSET
7D97 3A           Ø226Ø          ABX             *ADD OFFSET IN
7D98 39           Ø227Ø          RTS             *AND RETURN
                  Ø228Ø *
                  Ø229Ø *ROUTINE TO CALCULATE THE
                  Ø23ØØ *POWERS OF 2 FROM BIT COUNT
                  Ø231Ø *
7D99 C6   8Ø      Ø232Ø POWERS   LDB #128        *START 'VALUE' AT 2^7
7D9B F7   7BEE    Ø233Ø          STB VALUE       *AND GET
7D9E F6   7BFØ    Ø234Ø          LDB BIT         *THE BIT COUNT
7DA1 27   Ø6      Ø235Ø POLOOP   BEQ POWOUT      *IF ZERO, BRANCH OUT
7DA3 74   7BEE    Ø236Ø          LSR VALUE       *SHIFT POWER RIGHT
7DA6 5A           Ø237Ø          DECB            *DECREMENT COUNT
7DA7 2Ø   F8      Ø238Ø          BRA POLOOP      *BRANCH THROUGH LOOP
7DA9 39           Ø239Ø POWOUT   RTS             *RETURN
                  Ø24ØØ *
                  Ø241Ø *SET BIT TO PRINT BLACK
                  Ø242Ø *
7DAA 39           Ø243Ø BLACK    RTS             *Does naught.  Kept for uniform
ity
                  Ø244Ø *
                  Ø245Ø *SET BIT TO PRINT WHITE
                  Ø246Ø *
7DAB 8D   Ø5      Ø247Ø WHITE    BSR RED
7DAD 8D   ØD      Ø248Ø          BSR GREEN
7DAF 8D   17      Ø249Ø          BSR BLUE
7DB1 39           Ø25ØØ          RTS
```

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                    Ø251Ø *
                    Ø252Ø *SET BIT TO PRINT RED
                    Ø253Ø *
7DB2 8D   E5        Ø254Ø RED     BSR POWERS
7DB4 E6   84        Ø255Ø         LDB ,X
7DB6 FA   7BEE      Ø256Ø         ORB VALUE
7DB9 E7   84        Ø257Ø         STB ,X
7DBB 39             Ø258Ø         RTS
                    Ø259Ø *
                    Ø26ØØ *SET BIT TO PRINT GREEN
                    Ø261Ø *
7DBC 8D   DB        Ø262Ø GREEN   BSR POWERS
7DBE E6   88 2Ø     Ø263Ø         LDB 32,X
7DC1 FA   7BEE      Ø264Ø         ORB VALUE
7DC4 E7   88 2Ø     Ø265Ø         STB 32,X
7DC7 39             Ø266Ø         RTS
                    Ø267Ø *
                    Ø268Ø *SET BIT TO PRINT BLUE
                    Ø269Ø *
7DC8 8D   CF        Ø27ØØ BLUE    BSR POWERS
7DCA E6   88 4Ø     Ø271Ø         LDB 64,X
7DCD FA   7BEE      Ø272Ø         ORB VALUE
7DDØ E7   88 4Ø     Ø273Ø         STB 64,X
7DD3 39             Ø274Ø         RTS
                    Ø275Ø *
                    Ø276Ø *SET BIT TO PRINT YELLOW
                    Ø277Ø *
7DD4 8D   DC        Ø278Ø YELLOW  BSR RED
7DD6 8D   E4        Ø279Ø         BSR GREEN
7DD8 39             Ø28ØØ         RTS
                    Ø281Ø *
                    Ø282Ø *SET BIT TO PRINT MAGENTA
                    Ø283Ø *
7DD9 8D   D7        Ø284Ø MAGENT  BSR RED
7DDB 8D   EB        Ø285Ø         BSR BLUE
7DDD 39             Ø286Ø         RTS
                    Ø287Ø *
                    Ø288Ø *SET BIT TO PRINT VIOLET
                    Ø289Ø *
7DDE 8D   DC        Ø29ØØ VIOLET  BSR GREEN
7DEØ 8D   E6        Ø291Ø         BSR BLUE
7DE2 39             Ø292Ø         RTS
                    Ø293Ø *
                    Ø294Ø *CHOOSE 4-COLOUR-SET FROM
                    Ø295Ø *FROM 8 POSSIBLE PRINTER
                    Ø296Ø *COLOURS.
                    Ø297Ø *
7DE3 8E   Ø4EØ      Ø298Ø SETCLR  LDX #$Ø4EØ      *SET CURSOR PRINT POSITION
7DE6 CC   6Ø6Ø      Ø299Ø         LDD #$6Ø6Ø      *CLEAR SCREEN FROM THERE
7DE9 ED   81        Ø3ØØØ CLS     STD ,X++        *
7DEB 8C   Ø6ØØ      Ø3Ø1Ø         CMPX #$Ø6ØØ     *END OF SCREEN?
7DEE 25   F9        Ø3Ø2Ø         BLO CLS         *NO, LOOP BACK
7DFØ 8E   Ø4EØ      Ø3Ø3Ø         LDX #$Ø4EØ      *YES, SET CURSOR POSITION
7DF3 9F   88        Ø3Ø4Ø         STX <$88        *FOR COLOUR OPTIONS
7DF5 8E   7F3Ø      Ø3Ø5Ø         LDX #CMESS      *GET MESSAGE LOCATION
7DF8 BD   7E9D      Ø3Ø6Ø         JSR PRINT       *PRINT IT
7DFB 8E   Ø58Ø      Ø3Ø7Ø         LDX #$Ø58Ø      *SET CURSOR POSITION FOR
```

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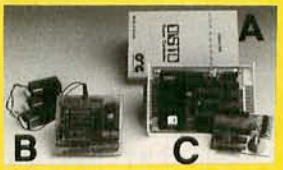

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EDITING FEATURES

VIP Writer III has a full featured screen editor which can be used to edit text with lines up to 240 characters long with or without automatic word wrap around. You can select type-over mode or insert mode. There is even an OOPS command to recall a cleared text buffer. Other editing features include: Type-ahead, typamatic key repeat and key beep for flawless text entry, end of line bell, full four way cursor control with scrolling, top of textfile, bottom of textfile, page up, page down, top of screen, bottom of screen, beginning of line, end of line, left one word, right one word, DELETE character, to beginning or end of line, word to the left or right, or entire line, INSERT character or line, LOCATE and/or CHANGE or DELETE single or multiple occurrence using wildcards, BLOCK copy, move or delete with up to TEN simultaneous block manipulations, TAB key and programmable tab stops, three PROGRAMMABLE FUNCTIONS to perform tasks such as auto column creation and disk file linking for continuous printing.

TEXT FORMATTING

VIP Writer III automatically formats your text for you or allows you to format your text in any way you wish. You can change the top, bottom, left or right margin and page length. You can set your text flush left, center or flush right. You can turn right hand justification on or off. You can have headers, footers, page numbers and TWO auxiliary lines which can appear on odd, even or all pages. You can also select the line on which they appear! You can even change the line spacing! All of these parameters can be altered ANYWHERE within your text file.

TEXT FILE COMPATIBILITY

VIP Writer III creates ASCII text files which are compatible with all other VIP Programs as well as other programs which use ASCII file format. You can use VIP Writer III to create BASIC, assembly, PASCAL or C files. VIP Writer III also allows you to save and load files using DISK or CASSETTE in the case of an emergency. You can even read disk directories, display free space on a disk and rename or kill disk files.

PREVIEW PRINT WINDOW

The VIP Writer III features a paper saving format window which allows you to preview your document BEFORE PRINTING IT! You are able to see centered text, margins, page breaks, orphan lines etc. This feature makes hyphenation a snap!

PRINTING

VIP Writer III supports most any printer serial or parallel using the parallel interface described in Nov-Dec. '87 RAINBOW magazine, or an external serial to parallel interface, and gives you the ability to select baud rates from 110 to 9600. You are able to imbed printer control codes anywhere in your text file EVEN WITHIN JUSTIFIED TEXT! VIP Writer III also has twenty PROGRAMMABLE PRINTER SEQUENCES which allow you to easily control all of your printers capabilities such as underline, bold, italics, superscript and subscript using simple keystrokes. Additional printer features include: single sheet pause, print pause, word length and line feed selection.

PRINT SPOOLING

VIP Writer III incorporates a built in print spooler with a 49,000 character buffer which allows you to print one document WHILE you are editing another. You no longer have to wait until your printer is done printing before starting another job!

DOCUMENTATION

VIP Writer III is supplied with a 125 page instruction manual which includes a tutorial, glossary of terms and a complete index. The manual is well written and includes many examples to aid in understanding and application. VIP Writer III includes VIP Speller at **NO ADDITIONAL COST.** **DISK $79.95**
Cassette version does not include VIP Speller. **TAPE $59.95**

VIP Writer owners: Upgrade to the VIP Writer III Disk for $49.95 or Tape for $39.95. Send original product. Include $3 shipping.

VIP WRITER - THE ORIGINAL

VIP Writer is also available for CoCo 1 and 2 owners and has all the features found in the VIP Writer III including VIP Speller except for the following: The screen display is 32, 51, 64 or 85 columns by 21 or 24 rows. Colors other than green, black or white are not supported. Help is not presented in colored windows. Double clock speed is not supported. Parallel printer interface is not supported. Print spooler is not available. Hard disk is not supported. Even so, the VIP Writer is a CoCo 1 or 2 owners best choice in word processors. VIP Writer includes VIP Speller at **NO ADDITIONAL COST.** **DISK $69.95**
Cassette version does not include VIP Speller. **TAPE $49.95**

VIP SPELLER SPELLING CHECKER

VIP Speller works with ANY ASCII file created by most popular word processors. It automatically checks text files for words to be corrected, marked for special attention or even added to the dictionary. You can even view the misspelled word in context! VIP Speller comes with a specially edited 50,000 word dictionary, and words can be added to or deleted from the dictionary or you can create one of your own. **DISK $34.95**

Please add $3.00 for shipping and handling. COD orders add an additional $2.25. Personal checks allow 3 weeks for delivery. All other orders are shipped the same day.

SD ENTERPRISES
(503) 663-2865 8:30 AM to 5:00 PM PST
P. O. Box 1233 Gresham, OR 97030

```
7DFE 9F    88       Ø3Ø8Ø          STX <$88        *COLOUR NUMBER QUERY
7EØØ 8E    7F93     Ø3Ø9Ø          LDX #CMESS2     *GET MESSAGE LOCATION
7EØ3 BD    7E9D     Ø31ØØ          JSR PRINT       *PRINT IT
7EØ6 8E    Ø5AØ     Ø311Ø          LDX #$Ø5AØ      *SET CURSOR POSITION FOR RESPON
SE
7EØ9 1Ø8E  7FEC     Ø312Ø          LDY #CTABLE     *POINT Y INTO COLOUR TABLE
7EØD C6    7Ø       Ø313Ø          LDB #$7Ø        *B HOLDS ASCII VALUE FOR 'Ø'
7EØF E7    84       Ø314Ø AGAIN    STB ,X          *PRINT B ON SCREEN
7E11 86    7D       Ø315Ø          LDA #$7D        *NOW PRINT AN
7E13 A7    Ø1       Ø316Ø          STA 1,X         *'=' ON THE SCREEN
7E15 BD    7EA8     Ø317Ø GETIT    JSR GETKEY      *GO AND WAIT FOR RESPONSE
7E18 8Ø    3Ø       Ø318Ø          SUBA #$3Ø       *NOW A SHOULD HAVE VALUE Ø-3
7E1A 2B    F9       Ø319Ø          BMI GETIT       *IF IT'S NEGATIVE, TRY AGAIN
7E1C 81    Ø7       Ø32ØØ          CMPA #7         *IS IT >7?
7E1E 22    F5       Ø321Ø          BHI GETIT       *YES, TRY AGAIN
7E2Ø A7    AØ       Ø322Ø          STA ,Y+         *OTHERWISE, STORE IT IN 'CTABLE
'
7E22 8B    7Ø       Ø323Ø          ADDA #$7Ø       *ADD TO GET PROPER SCREEN CHARA
CTER
7E24 A7    Ø2       Ø324Ø          STA 2,X         *PRINT IT ON THE SCREEN
7E26 3Ø    Ø8       Ø325Ø          LEAX 8,X        *MOVE X TO NEXT RESPONSE LOCATI
ON
7E28 5C             Ø326Ø          INCB            *INCREMENT COUNTER
7E29 C1    74       Ø327Ø          CMPB #$74       *IS IT LOWER THAN '4'?
7E2B 25    E2       Ø328Ø          BLO AGAIN       *YES, GET NEXT RESPONSE
7E2D 39             Ø329Ø          RTS             *NO, THEN RETURN
                    Ø33ØØ *
                    Ø331Ø *DUMP BUFFERS TO PRINTER
                    Ø332Ø *
7E2E 8D    6Ø       Ø333Ø DUMPØ    BSR GRAFIX      *GO SEND CONTROL CODES TO PRINT
ER
7E3Ø 8E    7B8C     Ø334Ø          LDX #RBUF       *POINT X TO BEGINNING OF BUFFER

7E33 A6    8Ø       Ø335Ø DUMP1    LDA ,X+         *GET NEXT BYTE
7E35 7D    7BEF     Ø336Ø          TST ENLRG       *TEST FOR LARGE PICTURE
7E38 26    Ø9       Ø337Ø          BNE ENLARG      *YES, THEN ENLARGE DATA
7E3A BD    A2BF     Ø338Ø          JSR $A2BF       *OTHERWISE SEND A TO PRINTER
7E3D 8C    7BEC     Ø339Ø BDUMP    CMPX #32+BBUF   *END OF BUFFERS?
7E4Ø 25    F1       Ø34ØØ          BLO DUMP1       *NO, GET NEXT BYTE
7E42 39             Ø341Ø          RTS             *YES, THEN RETURN
                    Ø342Ø *
                    Ø343Ø *ROUTINE TO ENLARGE DATA
                    Ø344Ø *EACH BIT IS EXPANDED
                    Ø345Ø *INTO TWO BITS.
                    Ø346Ø *
7E43 34    Ø2       Ø347Ø ENLARG   PSHS A          *SAVE BYTE TO SEND
7E45 84    FØ       Ø348Ø          ANDA #24Ø       *CLEAR RIGHT NIBBLE
7E47 85    1Ø       Ø349Ø          BITA #16        *TEST BIT 4
7E49 27    Ø2       Ø35ØØ          BEQ T32         *BRANCH IF CLEAR
7E4B 88    13       Ø351Ø          EORA #19        *SET BITS Ø,1 RESET BIT 4
7E4D 85    2Ø       Ø352Ø T32      BITA #32        TEST BIT 5
7E4F 27    Ø2       Ø353Ø          BEQ T64         *BRANCH IF CLEAR
7E51 88    2C       Ø354Ø          EORA #44        *SET BITS 2,3 RESET BIT 5
7E53 85    4Ø       Ø355Ø T64      BITA #64        *TEST BIT 6
7E55 27    Ø2       Ø356Ø          BEQ T128        *BRANCH IF CLEAR
7E57 88    7Ø       Ø357Ø          EORA #112       *SET BITS 4,5 RESET BIT 6
7E59 85    8Ø       Ø358Ø T128     BITA #128       *TEST BIT 7
```

OWL-WARE

Proven Technology

New CoCo 3 Utilities

Great for 512K Systems! From Color Venture and OWL-WARE

PRINTER LIGHTNING

A great print spooler which gives you 44K print buffer from a 128K CoCo and up to 438K (200 pages!) from a 512K CoCo. With this spooler you can run a program while you are printing a file. The spooler does not slow down the computer to any noticeable extent while you are running a second program and no lost characters arise. Baud rates selectable. ***Printer Lightning*** can reside in memory along with ***RAMDISK***!

RAMDISK

Using 512K CoCo 3 you have access to 2 additional disk drives in RAM. All disk commands are supported, and the data are Reset button protected. You can now have up to 5 disk drive capacities on line at once and can assign the ram disks to any drive number. By making the ramdisk Drive 0, all programs which require a lot of drive access will run much faster. You can have the ***RAMDISK*** in memory at the same time as the ***Printer Lightning***!

BACKUP LIGHTNING

This program is the fastest way to make backup copies of your files using a 512K CoCo. You can backup 35, 40, or 80 track disks single or double sided. Both RS and OS-9 disks may be backed up. The original disk is saved to memory and a copy can be made on an ***unformatted disk*** every 45 seconds! The lightning read, write, format, and verify routines that were developed make this program much quicker that RSDOS or OS-9 for backups. This will become one of your most used programs!

·NEW·NEW·

Only $19.95 each. 3 for $39.95.

SPECIAL With our 512K Upgrade (Next page) only $2. each or 3 for $5!

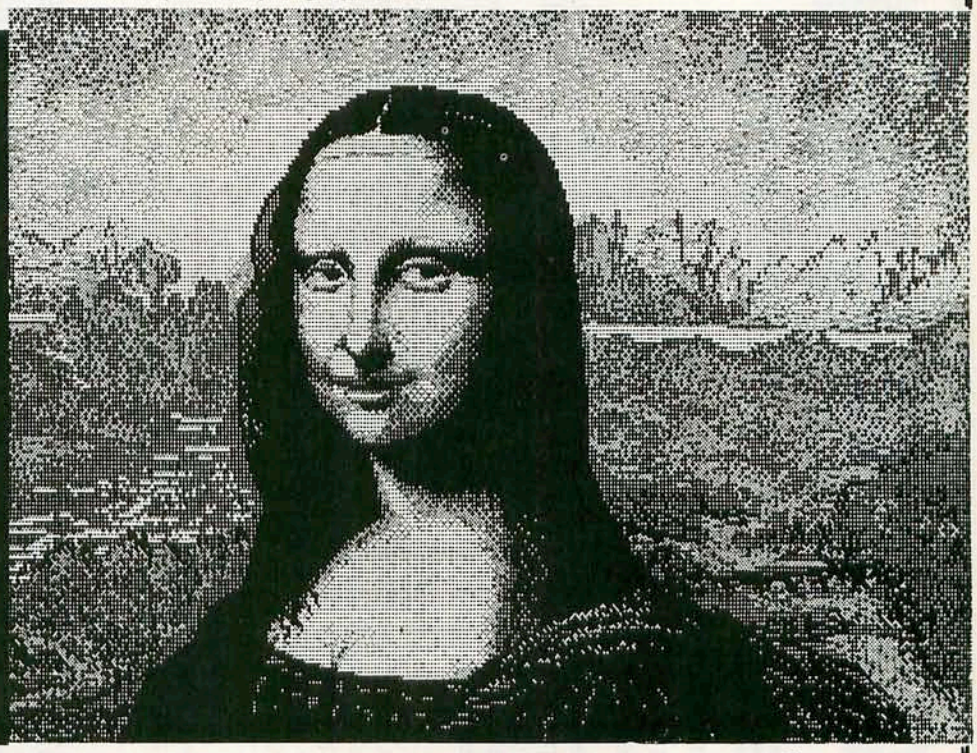
Announcing:

The finest graphics/drawing program for the COCO 3!

Da Vinci 3

- 16 colors on screen at one time
- Modify each color from 64 available colors
- Use composite or RGB monitor
- Draw with custom paintbrushes
- Full resolution 320 X 192
- Picture converter for conversion of COCO 2 pictures to COCO 3
- Multiple text fonts
- Accepts input from joystick, X-pad, mouse, or touch-pad
- Boxes, circles, line, paint generation
- Screen dump for Tandy mono and color ink-jet printers, (NX-10 and others pending)
- Sensible price
- No additional hardware required because of course/fine joystick movement modes
- Zoom mode for individual pixel editing
- Great on screen menu which is removable at the touch of a key to allow full screen edit

128K or 512K COCO 3 $37.95



Super I/O Board for OS-9

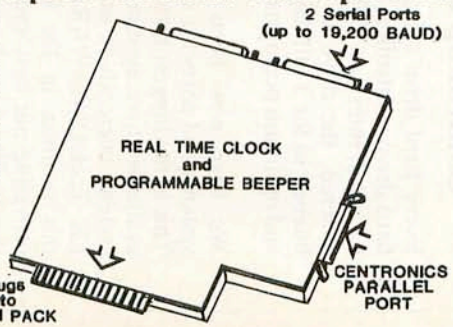
Each Board Provides 2 Serial Ports and Centronics Parallel Port

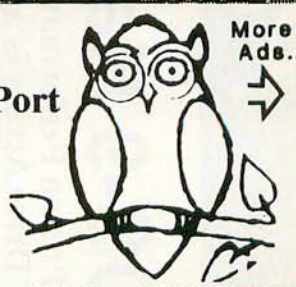
First Board has Real Time Clock and Beeper... With Second Board up to 5 Users

The serial ports are usable **up to 19,200 Baud**, and the parallel port is a **true Centronics standard**. Plug into your multi-pak. **On CoCo 3, multi-pak must be upgraded**. You will have a multi-user system with additional computers or terminals plugged into the serial ports. An OWL hard drive and 512K upgrade are strongly recommended for multi-user systems.

Intro Price... **$169.**

BOARD 2... $145.





More Ads...

OWL-WARE

P.O. Box 116-A
Mertztown, PA 19539
— ORDER LINES (only) —
(800) 245-6228
(215) 682-6855 (PA)

Proven Technology

On the Razor's Edge of the Color Computer Frontier

OS-9 Hard Drive Systems

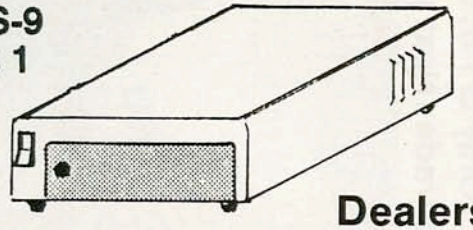
Proven Performance for Demanding Home or Business Use
Drive Access is at *Least 8 Times Faster* than Floppy Drives
Control up to 2 Drives per Controller each as Continuous Storage

Every hard drive system is **complete** with software, hard drive, controller, heavy-duty power supply, and LR Tech Interface. When a complete drive system is ordered, the drive is fully **assembled**, **tested**, and **burned in** for 3 full days. This ensures dependability and optimum performance.

We have now been supplying CoCo hard drive systems and parts for systems for more than 2 years. This is the longest history in the CoCo market of any available drive system. About ¾ of all hard drive systems currently in use in the CoCo market use the LR Tech/OWL-WARE system. We have reached this position in the CoCo hard drive market by providing our customers with a quality product that they (and we) can be proud to own and use.

A number of drive systems were in the market place when the LR Tech Interface was introduced and 2 have been introduced since. Most of these are no longer available. We provide the only system which provides a combination of standard interface (SASI), rugged unit construction (not hacked to a floppy drive controller), high speed, and reasonable price. **These systems are even several times faster than the standard XT hard drive system.** Ideal for multi-user system because processor does not stop for hard drive access.

For OS-9 Levels 1 and 2



System Prices: New!

$469. $619. $739. $1,069.

10 Meg. 20 Meg. 40 Meg. 80 Meg. (2x40 Meg.)

Dealers Inquiries Invited!

Hard Drive Interface (Includes Software)

For those who want to put together their own system, we have an exclusive arrangement to distribute the LR Tech Interface. Please note that an interface is not a controller. **A Xebec, WD, or Adaptec SASI controller are required for a drive system.**

To assemble a hard drive system yourself requires some reasonable knowledge of OS-9 and electronic construction and **a hard drive that works.** CoCo 3 users will have to upgrade their Multi-pak.

Only $119.

Xebec Controller $135.

CoCo 3 512K Upgrade

The LR Tech 512K upgrade uses all **gold contacts** and **120 nanosecond 256K chips.** Provides large system memory from OS-9 Level 2.

Without Mem Chips $49. **With Chips** (CALL: Sorry, the price of RAM CHIPS is going up)

Special! See software offer on previous page.

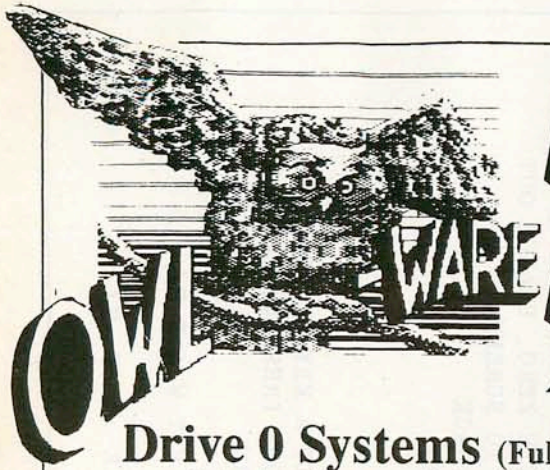
Hard Drive Basic

New For the CoCo 3!
In Answer for the Many Reqests to Run BASIC from a Hard Drive

With the development of the CoCo 3, OWL Ware has been able to provide a truly professional Hard Drive System using OS-9. There has not, however, been a method of running your programs from the standard BASIC. With this latest development of the CoCo software aces, it is now possible to partition your hard drive into RSDOS and OS-9 sections. The OS-9 partition runs your OS-9 normally. The RSDOS section is further divided into a number of floppy sized units to run RSDOS programs. The familiar RS disk commands work normally. There is little more that must be learned.

All of these RS drive sections are available at all times. It is not necessary to use assign commands and get access to only a few of these sections. Programs that use RS-BASIC should work as will all programs which do not force their own disk drivers.

Call about prices. This should be availabile by the time you read this ad!



DISK DRIVES

OWL-WARE PHONES
ORDERS
(800) 245-6228
PA (215) 682-6855
TECHNICAL HELP
(215) 433-8695
Call for advice

Ask for the WHISPER DRIVE for the finest, quietest drive available!

Drive 0 Systems (Full Hgt) **$169.** (Half Hgt - DS) **$219.**
Drive 0 systems complete with drive, controller, legal DOS, cable, case & power supply, and manual.

Drive 1 Systems (Full Hgt) **$95.** (Half Hgt - DS) **$129.**
New! New! (3.5" 720K Drive for OS-9) **$189.**
Drive 1 has drive, case & power supply, and instructions for use with your drive.

(Call for Special Prices on Drive 0, 1, 2, 3 Combos.)

HALF HEIGHT DRIVE UPGRADE KIT FOR RS HORIZONTAL CASES

Why only double the capacity of your system when you can triple in the same case? Kit includes: double sided drive to fit your case, chip to run both sides of new drive, hardware, and detailed instructions. Takes only 5 minutes.

Model 500 **$119.** Model 501 or 502 **$129.**

Our prices do not include shipping costs, but do include a discount for cash.

OWL-WARE has a liberal warranty policy. During the warranty period, all defective items will be repaired or replaced at our option and at no cost to the buyer except for shipping costs.

Call our technical help line for return authorization numbers. Return of non-defective items or unauthorized returns are subject to a service charge.

All drives are new and fully assembled. We ship only *FULLY TESTED and CERTIFIED DRIVES* at these low prices. Full height drives are unused surplus and not always available.

We use Fuji, Teac and Other Fine brands. We have *5 years experience* in the CoCo disk drive market! We are able to provide support when you have a problem.

NOW FOR CoCo 1, 2, 3!!

WARRANTIES
Full Hgt 90 days Half Hgt 1 Year

ORDER LINES (only)
(800) 245-6228
(215) 682-6855 (PA)

TECH HELP LINE
(215) 433-8695
Call for Latest Prices!

Bonus! Special Bundled Software with Disk Drive Purchase!

OWL-WARE
P.O. Box 116-A
Mertztown, PA 19539

OWL-WARE Software Bundle

Disk Tutorial - 3 Utilities - 2 Games

DISK TUTOR Ver. 1.1

Learn how to use your disk drive from this multi-lesson, machine language program. This tutor takes you through your lessons and corrects your mistakes for a quick, painless disk drive intoduction. (This professionally written tutor is easily worth the bundle's total price.)

OWL DOS

An operating system that gives faster disk access and allows the use of double-sided drives. Corrects a floating point number error on early CoCo systems.

COPY-IT

Quickly copies selected programs between disks. A wild card option selects groups of programs for copy.

VERIFY

Verifies reading of each sector. Bad sectors are listed on the screen.

2 GAMES

We will select 2 games from our stock. These have sold for more than $20 each.

If sold separately this is over $125 worth of software!!

Do not mistake this software with cheap, non-professional "Public Domain" software which is being offered by others. All of this software is copyrighted and professional in quality. The tutor is unique with us and has helped hundreds of new users learn their disk drive.

only **$27.95**
(or even better)
only **$6.95** *with any Disk Drive Purchase!!*

```
7E5B 27   Ø2       Ø359Ø          BEQ ENLG2       *BRANCH IF CLEAR
7E5D 8A   CØ       Ø36ØØ          ORA #192        *SET BITS 6,7
7E5F BD   A2BF     Ø361Ø ENLG2    JSR $A2BF       *SEND A TO PRINTER
7E62 35   Ø2       Ø362Ø          PULS A          *RECOVER ORIGINAL VALUE
7E64 84   ØF       Ø363Ø          ANDA #15        *CLEAR LEFT NIBBLE
7E66 85   Ø8       Ø364Ø          BITA #8         *TEST BIT 3
7E68 27   Ø2       Ø365Ø          BEQ T4          *BRANCH IF CLEAR
7E6A 88   C8       Ø366Ø          EORA #2ØØ       *SET BITS 6,7 RESET BIT 3
7E6C 85   Ø4       Ø367Ø T4       BITA #4         *TEST BIT 2
7E6E 27   Ø2       Ø368Ø          BEQ T2          *BRANCH IF CLEAR
7E7Ø 88   34       Ø369Ø          EORA #52        *SET BITS 4,5 RESET BIT 2
7E72 85   Ø2       Ø37ØØ T2       BITA #2         *TEST BIT 1
7E74 27   Ø2       Ø371Ø          BEQ T1          *BRANCH IF CLEAR
7E76 88   ØE       Ø372Ø          EORA #14        *SET BITS 2,3 RESET BIT 1
7E78 85   Ø1       Ø373Ø T1       BITA #1         *TEST BIT Ø
7E7A 27   Ø2       Ø374Ø          BEQ ENLG3       *BRANCH IF CLEAR
7E7C 8A   Ø3       Ø375Ø          ORA #3          *SET BITS Ø,1
7E7E BD   A2BF     Ø376Ø ENLG3    JSR $A2BF       *SEND A TO PRINTER
7E81 2Ø   BA       Ø377Ø          BRA BDUMP
                   Ø378Ø *
                   Ø379Ø *ROUTINE TO CLEAR BUFFERS
                   Ø38ØØ *
7E83 8E   7B8C     Ø381Ø CLEARØ   LDX #RBUF       *POINT X TO START OF BUFFER
7E86 4F            Ø382Ø          CLRA            *CLEAR OUT
7E87 5F            Ø383Ø          CLRB            *REGISTER D
7E88 ED   81       Ø384Ø CLEAR    STD ,X++        *CLEAR TWO BYTES IN BUFFER
7E8A 8C   7BEC     Ø385Ø          CMPX #32+BBUF   *ARE WE DONE?
7E8D 25   F9       Ø386Ø          BLO CLEAR       *NO, LOOP BACK
7E8F 39            Ø387Ø          RTS             *YES, THEN RETURN
                   Ø388Ø *
                   Ø389Ø *ROUTINE TO SEND GRAFICS SETUP TO PRINTER
                   Ø39ØØ *
7E9Ø 8E   7FE8     Ø391Ø GRAFIX   LDX #PTABLE     *POINT X TO CODE TABLE
7E93 A6   8Ø       Ø392Ø GRLOOP   LDA ,X+          *GET NEXT BYTE
7E95 27   Ø5       Ø393Ø          BEQ GRFOUT      *IF IT'S ZERO THEN BRANCH OUT
7E97 BD   A2BF     Ø394Ø          JSR $A2BF       *OTHERWISE SEND A TO PRINTER
7E9A 2Ø   F7       Ø395Ø          BRA GRLOOP      *AND LOOP BACK
7E9C 39            Ø396Ø GRFOUT   RTS             *RETURN
                   Ø397Ø *
                   Ø398Ø *ROUTINE TO PRINT A MESSAGE
                   Ø399Ø *POINTED TO BY X.
                   Ø4ØØØ *
7E9D A6   8Ø       Ø4Ø1Ø PRINT    LDA ,X+         *GET NEXT CHARACTER
7E9F 27   Ø6       Ø4Ø2Ø          BEQ POUT        *IF IT'S ZERO, BRANCH OUT
7EA1 AD   9F AØØ2  Ø4Ø3Ø          JSR [CHROUT]    *SEND TO SCREEN
7EA5 2Ø   F6       Ø4Ø4Ø          BRA PRINT       *LOOP BACK
7EA7 39            Ø4Ø5Ø POUT     RTS             *RETURN
                   Ø4Ø6Ø *
                   Ø4Ø7Ø *GET RESPONSE FROM KEYBOARD
                   Ø4Ø8Ø *
7EA8 AD   9F AØØØ  Ø4Ø9Ø GETKEY   JSR [POLCAT]    *GO GET A KEY PRESS
7EAC 27   FA       Ø41ØØ          BEQ GETKEY      *IF NONE PRESSED, LOOP.
7EAE 39            Ø411Ø          RTS             *RETURN
                   Ø412Ø *
7EAF      2Ø       Ø413Ø TITLE    FCC /    T L S   S O F T W A R E/
7ECB      ØDØD     Ø414Ø          FDB $ØDØD
7ECD      2Ø       Ø415Ø          FCC /    P  R  E  S  E  N  T  S/
```

```
7EE8    ØDØD    Ø416Ø          FDB $ØDØD
7EEA    2Ø      Ø417Ø          FCC /          IMAGE  V1.3/
7EFF    ØD      Ø418Ø          FCB $ØD
7FØØ    2Ø      Ø419Ø          FCC /  FOR THE RADIO SHACK CGP-22Ø/
7F1D    ØØ      Ø42ØØ          FCB Ø
7F1E    45      Ø421Ø QUERY1   FCC /ENLARGE ?/
7F27    ØØ      Ø422Ø          FCB Ø
7F28    5Ø      Ø423Ø QUERY2   FCC /PMODE ?/
7F2F    ØØ      Ø424Ø          FCB Ø
7F3Ø    2Ø      Ø425Ø CMESS    FCC /     Ø=BLACK     4=BLUE/
7F46    ØD      Ø426Ø          FCB $ØD
7F47    2Ø      Ø427Ø          FCC /     1=WHITE     5=YELLOW/
7F5F    ØD      Ø428Ø          FCB $ØD
7F6Ø    2Ø      Ø429Ø          FCC /     2=RED       6=VIOLET/
7F78    ØD      Ø43ØØ          FCB $ØD
7F79    2Ø      Ø431Ø          FCC /     3=GREEN     7=MAGENTA/
7F92    ØØ      Ø432Ø          FCB Ø
7F93    54      Ø433Ø CMESS2   FCC /TYPE COLOUR # FOR SCREEN VALUE/
7FB1    ØØ      Ø434Ø          FCB Ø
7FB2    65      Ø435Ø PMESS    FCC /eVEN RED OR oDD RED?/
7FC6    ØØ      Ø436Ø          FCB Ø
7FC7    5Ø      Ø437Ø BLKWHT   FCC /PRINT SET BITS AS bLACK OR wHITE/
7FE7    ØØ      Ø438Ø          FCB Ø
7FE8    1B43    Ø439Ø PTABLE   FDB $1B43        *VALUES TO SET PRINTER
7FEA    2ØØØ    Ø44ØØ          FDB $2ØØØ        *TO COLOR-SCAN MODE
7FEC    ØØ      Ø441Ø CTABLE   FCB Ø            *VALUES Ø-7 CORRESPONDING TO
7FED    Ø1      Ø442Ø          FCB 1            *INK COLOURS IN 'JTABLE'
7FEE    Ø2      Ø443Ø          FCB 2            *THESE ARE INDIRECT JUMPS TO TH
E
7FEF    Ø3      Ø444Ø          FCB 3            *COLOUR ROUTINES ABOVE
7FFØ    7DAA    Ø445Ø JTABLE   FDB BLACK
7FF2    7DAB    Ø446Ø          FDB WHITE
7FF4    7DB2    Ø447Ø          FDB RED
7FF6    7DBC    Ø448Ø          FDB GREEN
7FF8    7DC8    Ø449Ø          FDB BLUE
7FFA    7DD4    Ø45ØØ          FDB YELLOW
7FFC    7DDE    Ø451Ø          FDB VIOLET
7FFE    7DD9    Ø452Ø          FDB MAGENT
        7BF6    Ø453Ø          END START

ØØØØØ TOTAL ERRORS
```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If you have an idea for the "Wishing Well," submit it to Fred c/o THE RAINBOW. Remember, keep your ideas specific, and don't forget this is BASIC. All programs resulting from your wishes are for your use, but remain the property of the author.

Cany ou deco deth ismes sage?

Reading and Decoding Skills

By Fred B. Scerbo
Rainbow Contributing Editor

Sometimes a single sentence in a reader's letter can stimulate an idea for a whole program. Other times, ideas from several different sources synthesize into a single listing. It is really funny how ideas for programs are born.

For this month's program I must admit I felt a little at a loss. Just stop and think of how many programs appear in this column every year. I'm not complaining, mind you, but everyone runs into writer's block eventually. Most of the suggestions I have received in past months have not been practical, and I was hoping for something that would have great educational value. (Yes, I am working on a new game, but it's taking several months to put together.)

Then an idea came from the most unlikely of sources. During my 10-minute homeroom period, a new student came up to me with an assignment sheet he had been given in his science class. The worksheet had a list of sentences for him to decode.

Normally I am opposed to using things like word search puzzles because most of my students have a difficult time reading words forward, let alone backward and upside down. Too often, classroom assignments like these tend to be "time wasters." Still, there was something different about his assignment that made it very interesting.

The sheet he had was made up of sentences in which the spaces between the words had been jumbled to such a degree that it would take some time to figure out exactly what the original sentence was. The sentence looked sort of like this:

Pla ntsma kefo odb yph otosy nthes is.

When you first see this sentence, you might not understand what's going on. However, if you look closely, you can decode the letters into real words by rearranging the spaces. The sentence above, once decoded, reads: Plants make food by photosynthesis.

From this jumbled sentence came the idea for a whole new program, *Jumble*, to help youngsters learn while using the CoCo. The program would take a sentence and jumble it. The student would then "un-jumble" the sentence and re-enter it into the computer. And users would also have the ability to supply their own sentences in DATA statements in order to create personalized software.

What are the advantages of such a program? Well, first of all, it provides the user with a new and exciting way to review educational material — it's almost like playing a game show. Secondly, a program like this helps to reinforce spelling skills. As I have mentioned in past columns, spelling is a difficult skill to reinforce on a computer. Some of my other programs have dealt with this skill directly; but, as a rule, most other programs are severely lacking in this area.

The Program

Devising the subroutines in *Jumble* to split up the sentences was actually quite easy. Each sentence from the DATA statements is measured for length using the LEN command. A FOR-NEXT loop counts through each character and deletes any spaces. Then another FOR-NEXT loop randomly inserts spaces back into this new spaceless string.

That was the easy part. Next came a tougher problem. It would not take too much effort simply to use the INPUT or LINEINPUT command to have the user type in a corrected sentence. However, the CoCo displays a 32-character screen on power-up, and the last thing I wanted was to have the user's text split up on the screen. What was needed was a routine that would let the screen appear to be like a word processor — a word-wrap routine.

This part took a little longer than I expected, but the final result was quite satisfying. Using the INKEY$ command, I wrote a set of commands that allow you to type, backspace and enter just as you do on a word processor; words reaching the end of the screen jump down to the next line. The only thing you are not able to do is move the cursor over the type on the screen. You can only backspace to correct text.

The subroutine is not perfect, however. Because the program is written in BASIC, it does tend to get a little slower as the statement you type gets longer. If you type too fast, you might get ahead of the program. But this should not be too great a problem, as you will be going rather slowly when you try to decode each sentence. You might consider inserting a high-speed poke in the program, provided you have already saved the program to tape or disk. (Note: Be sure to remember that CoCo 1 and 2 can use POKE65495,0 in most cases, while the CoCo 3 can use POKE65497,0. Some CoCos cannot use the high-speed poke when a disk controller is plugged in. When in doubt, leave it out.)

Let's say, for instance, that you want to try the sample sentences I have included in this listing. When the title card comes up on the screen, you may press I for Instructions or Q for Quiz. Many readers have recently requested

---

Fred Scerbo is a special needs instructor for the North Adams Public Schools in North Adams, Massachusetts. He holds a master's in education and has published some of the first software available for the Color Computer through his software firm, Illustrated Memory Banks.

that I include an Instructions option, so I figured this was as good a program as any to start with.

After reading the instructions or choosing the quiz, your quiz statements will be selected at random. At various times the screen will read, "Please stand by." This indicates that the program is creating a new jumbled sentence. Once the sentence appears, you may type your response at the bottom of the screen.

If at any point you want to check your progress, press the @ key; and you will be shown our standard score card. You may continue where you left off by pressing C. However, any typing you have done prior to that on a given statement will be lost and the sentence will be rejumbled. (Pressing C after the last problem may confuse the program and give you a blank sentence.)

You may rerun the program by pressing Y or end by pressing N. That really sums up the whole program. *Jumble* is not difficult to use, and it really can be lots of fun. You can actually have two students race to see who gets through all the sentences first, on two different CoCos. (I intentionally left out a timer option as different generations of CoCos run at different clock speeds, making uniform timing on different CoCos very difficult.)

Adding Your Own Sentences

You can dump my sentences by typing `DEL 1000-4999`. But the last line of the program must always be `5000 DATA END`.

You can add up to 50 sentences of your own by simply typing them into `DATA` statements starting in Line 1000. For uniformity, put each sentence in quotation marks — this prevents any problems with commas in your data. Here are samples you might try for younger CoCo users, as the data in my listing is a little bit tougher:

```
1000 DATA "TOM HAS A NEW HAT."
1010 DATA "SUE TIED HER SHOES."
1020 DATA "SEE TIGER JUMP."
```

You can make the sentences as simple or as complex as you like, and use the program with students from first grade through high school and beyond. The uses are really unlimited — foreign language statements, algebraic expressions or proofs, scientific notes, etc., are all possibilities. Be sure to save your new listings to tape or disk under different filenames. You can create a large library of customized educational software for your CoCo.

Many, Many Thanks!

Several months ago I suggested that anyone owning old, unused, dust-collecting CoCos could contact me if they wanted to donate them to a good cause. Since that time (which is actually only two weeks from the time of publication), several very kind people have donated valuable equipment to my special needs students for classroom use. My sincerest thanks go out to Fred Edwards, Paul French and David Brooks. Anyone who has sent equipment since will be acknowledged in future issues.

Once again I will mention that we can still use any old CoCos or disk drives. Anyone who wishes to make such a donation as a tax write-off may contact me at (413) 663-9648 after 9 p.m. (since it is still wrestling season for my team) or contact me at my home address or c/o Drury High School, South Church St., North Adams, MA 01247.

Again, thanks to all of you for your generosity. See you next month. □

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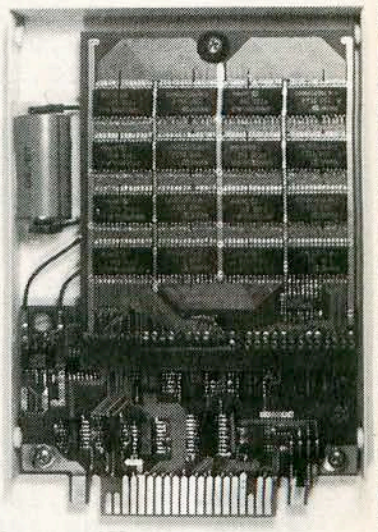

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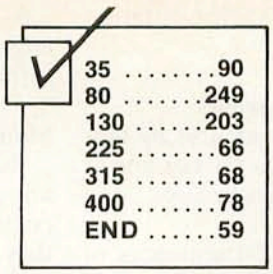
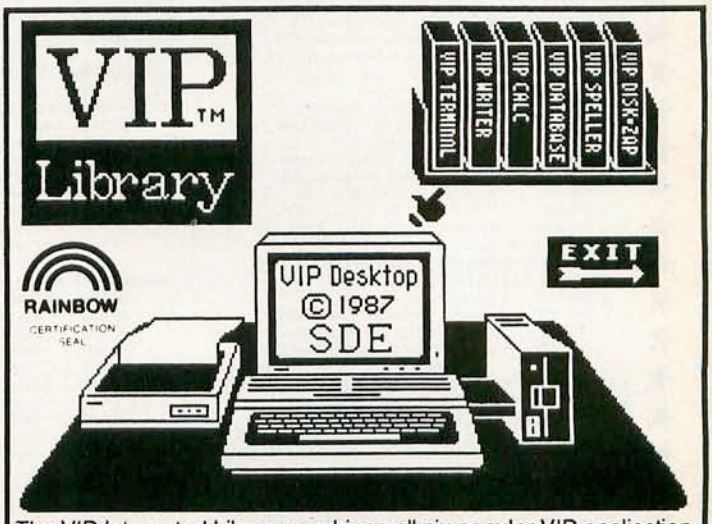


The listing: JUMBLE

```
1 REM ************************
2 REM *   DECODING SKILLS     *
3 REM *   A DECODING GAME     *
4 REM *   BY FRED B.SCERBO    *
5 REM *    6Ø HARDING AVE.    *
6 REM * NORTH ADAMS,MA Ø1247 *
7 REM *  COPYRIGHT (C) 1988   *
8 REM ************************
9 CLEAR3ØØØ:CLSØ:PRINTSTRING$(32
,188);STRING$(32,2Ø4);:FORI=1TO2
56:READA:PRINTCHR$(A+128);:NEXT
1Ø PRINTSTRING$(32,195);STRING$(
32,179);
15 DATA29,28,28,26,29,28,29,21,2
8,28,26,3Ø,28,28,26,29,28,28,29,
2Ø,29,28,21,31,18,16,29,24,3Ø,28
,28,29
2Ø DATA21,,,26,21,19,18,21,,,,26
,,,26,21,,,21,,21,,16,26,29,18,2
1,,26,,19,19
25 DATA21,,,26,21,,17,21,,,18,26
,,,26,21,,,21,,21,,16,26,16,29,2
3,,26,,16,21
3Ø DATA28,28,28,24,28,28,28,2Ø,2
8,28,24,28,28,28,24,28,28,28,28,
2Ø,28,28,2Ø,28,16,96,28,24,28,28
,28,28
35 DATA11Ø,1Ø8,1Ø8,1Ø8,1Ø8,1Ø9,1
ØØ,11Ø,,97,11Ø,,1Ø8,11Ø,1Ø4,1ØØ,
1Ø9,1Ø8,,,1ØØ,1Ø9,1Ø8,,96,96,11Ø
,1Ø8,1Ø8,1Ø8,1Ø8,1Ø9
4Ø DATA1Ø7,99,99,99,99,99,,1Ø7,9
9,11Ø,96,,,1Ø6,,,1Ø1,,,,,1Ø1,,,,
,1Ø7,99,99,99,99,99
45 DATA98,,,,,1Ø1,,1Ø6,,1Ø9,98,,
96,1Ø6,,,1Ø1,,,,98,1Ø1,,,,98,98,
,,,,1Ø1
5Ø DATA1Ø8,1Ø8,1Ø8,1Ø8,1Ø8,1Ø8,1
ØØ,1Ø4,,,1Ø8,,1Ø8,1Ø8,1Ø4,1ØØ,1Ø
8,1Ø8,1Ø8,1Ø8,1Ø4,1Ø8,1Ø8,1Ø8,1Ø
8,1Ø4,1Ø8,1Ø8,1Ø8,1Ø8,1Ø8,1Ø8
55 PRINT@419,"     BY FRED B.SCE
RBO     ";
6Ø PRINT@453,"  COPYRIGHT (C) 19
88  ";
65 PRINT@483," <I>NSTRUCTIONS OR
 <Q>UIZ ";
7Ø X$=INKEY$:XX=RND(-TIMER):IFX$
="I"THEN75ELSEIFX$="Q"THEN135ELS
E7Ø
75 CLS:PRINT@34,"THIS PROGRAM IS
 DESIGNED TO     HELP YOU REVIEW
 IMPORTANT       INFORMATION IN
A FUN AND        EXCITING WAY.":
PRINT@194,"YOU WILL BE GIVEN A S
ENTENCE    WHICH HAS THE SPACES
IN IT      JUMBLED AROUND."
8Ø PRINT@322,"YOU MUST RE-TYPE T
HE SENTENCE   SO THAT IT IS CORR
ECT & MAKES   SENSE."
85 PRINT@45Ø,"PRESS <ENTER> TO C
ONTINUE.";
9Ø IFINKEY$<>CHR$(13)THEN9Ø
95 CLS:PRINT@34,"HERE IS AN EXAM
PLE OF SUCH      A SENTENCE:":PR
INT@13Ø,"T HEC OWWA SST ANDING U
P."
1ØØ PRINT@194,"YOU WOULD DECODE
THIS TO READ:":PRINT@258,"THE CO
W WAS STANDING UP."
1Ø5 PRINT@322,"PRESS <ENTER> WHE
N YOU THINK    THAT YOU HAVE THE
 SENTENCE      RIGHT."
11Ø PRINT@45Ø,"PRESS <ENTER> TO
CONTINUE.";
115 IFINKEY$<>CHR$(13)THEN115
12Ø CLS:PRINT@34,"IF YOU DO NOT
GET THE ANSWER    CORRECT, YOU W
ILL BE GIVEN A    CHANCE TO TRY
IT AGAIN. YOU     MAY CHECK THE
SCORECARD BY      PRESSING THE <
@> KEY. YOU MAY   THEN RETURN TO
 THE PROGRAM BY   PRESSING <C> T
O CONTINUE"
125 PRINT@29Ø,"BE SURE TO TYPE S
LOWLY!":PRINT@354,"PRESS <ENTER>
 TO BEGIN."
13Ø IFINKEY$<>CHR$(13)THEN13Ø
135 CLSØ
14Ø DIMAO(5Ø),A$(5Ø),B$(5Ø),NP(5
Ø)
145 CLSØ:GOTO18Ø
15Ø D=Ø
155 IFLEN(J$)<=27THEN17Ø
16Ø FORT=27TOØSTEP-1:IFMID$(J$,T
,1)=" "THEN175
165 NEXT
17Ø W$=J$+C$:F=LEN(W$):PRINT@M+D
,W$;STRING$(X-F,32):RETURN
175 W$=LEFT$(J$,T):C$="":W$=W$+C
$:F=LEN(W$):PRINT@M+D,W$;STRING$
(X-F,32):C$=D$:J$=S$+RIGHT$(J$,(
LEN(J$))-T):D=D+32:GOTO155
18Ø FORJ=1TO5Ø:READ A$(J):IFA$(J
)="END"THEN19Ø
185 NEXTJ
19Ø CLSØ:J=J-1
195 FORI=1TOJ
2ØØ AO(I)=RND(J)
2Ø5 IFNP(AO(I))=1THEN 2ØØ
```

```
21Ø NP(AO(I))=1:NEXTI
215 FORP=1TOJ
22Ø CLS:PRINT@232,"PLEASE STAND
BY":A$="":B$="":R$="":C$="":D$="
":S$="    "
225 Q$=A$(AO(P)):K=LEN(Q$)
23Ø FORN=1TOK:IFMID$(Q$,N,1)=" "
THEN24Ø
235 A$=A$+MID$(Q$,N,1)
24Ø NEXTN
245 K=LEN(Q$):B$=LEFT$(A$,3):FOR
N=4TOK
25Ø R=RND(12):IFR>4THEN26Ø
255 B$=B$+" "
26Ø B$=B$+MID$(A$,N,1):NEXTN
265 CLS:PRINT@35,"DECODE STATEME
NT NO.";P:M=96::J$="    "+B$:X=31
:GOSUB15Ø
27Ø M=289:PRINT@289,"=>"+CHR$(12
8);
275 X=29:C$=CHR$(128):D$=CHR$(12
8):S$="  "
28Ø Y$=INKEY$:IFY$="@"THEN345ELS
EIFY$=CHR$(13)THEN3ØØELSEIFY$=CH
R$(8)THEN29ØELSEIFY$=""THEN28Ø
285 R$=R$+Y$:J$="  "+R$:PRINT@29
1,"";:GOSUB15Ø:PRINT:GOTO28Ø
29Ø IFLEN(R$)<1THEN28Ø
295 M=289:L=LEN(R$):R$=LEFT$(R$,
L-1):PRINT@M,"";:J$="  "+R$:GOSU
B15Ø:PRINT:GOTO28Ø
3ØØ IFR$=Q$THEN3Ø5ELSE315
3Ø5 PRINT@48Ø,"  YOU ARE ABSOLUT
ELY CORRECT!! ";
31Ø CR=CR+1:GOTO335
315 PRINT@48Ø,"  SORRY, THAT IS
NOT CORRECT !";
32Ø IR=IR+1
325 X$=INKEY$:IFX$=CHR$(13)THEN3
3ØELSEIFX$="@"THEN345ELSE325
33Ø PRINT@48Ø,STRING$(3Ø,32);:GO
TO28Ø
335 X$=INKEY$:IFX$=CHR$(13)THEN3
4ØELSEIFX$="@"THEN345ELSE335
34Ø NEXTP
345 CLS:PRINT@128,"";
35Ø L=CR+IR:IF L=Ø THEN L=1
355 PRINT"    NUMBER CORRECT = "
CR
36Ø PRINT
365 PRINT"    NUMBER WRONG   = "
IR
37Ø PRINT:PRINT"    STUDENT SCOR
E  = ";INT(CR*1ØØ/L);"%"
375 PRINT:PRINT"    ANOTHER TRY
(Y/N/C)";
38Ø W$=INKEY$:IFW$=""THEN38Ø
385 IF W$="Y" THEN RUN
39Ø IF W$="N" THEN CLS:END
395 IF W$="C" THEN 22Ø
4ØØ GOTO38Ø
99Ø REM ENTER DATA AT LINE 1ØØØ
1ØØØ DATA "FOOD IS AN ESSENTIAL
PART OF EVERYONE'S DAILY LIFE."
1Ø1Ø DATA "WATER IS AN EVEN MORE
 IMPORTANT PART OF A PERSON'S DA
ILY INTAKE."
1Ø2Ø DATA "YOU COULD GO FOR MORE
 DAYS WITHOUT FOOD THAN YOU COUL
D WITHOUT WATER."
1Ø3Ø DATA "HUMANS ALSO NEED A CE
RTAIN AMOUNT OF SLEEP EACH DAY."
1Ø4Ø DATA "THE HUMAN BODY MUST B
REAK DOWN FOOD BEFORE IT CAN BE
ABSORBED."
1Ø5Ø DATA "MANY PEOPLE BELIEVE T
HAT ALL-NATURAL FOODS ARE BETTER
 FOR YOU."
1Ø6Ø DATA "SOME PEOPLE GET VERY
UPSET WITH THE CHEMICALS THEY FI
ND IN THEIR FOOD."
1Ø7Ø DATA "GOOD EATING HABITS US
UALLY LEAD TO GOOD HEALTH."
1Ø8Ø DATA "TOO MUCH SUGAR IN YOU
R DIET IS NOT GOOD."
1Ø9Ø DATA "FIBER IS AN IMPORTANT
 PART OF YOUR DIET, TOO."
5ØØØ DATA END
```

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ADVANCED STAR*TRENCH (THE RAINBOW, 7/86)
4,750 ★Stephane Martel, Laval, Quebec
4,475 David Schaller, Clarkston, WA
4,300 Jeffrey Warren, Waynesville, NC
3,960 Maurice MacGarvey, Dawson Creek, British Columbia
3,960 Robbi Smith, Helena, HI

ASTRO BLAST *(Mark Data)*
48,825 ★Tony Bacon, Mt. Vernon, IN

BEE ZAPPER (THE RAINBOW, 9/87)
10,500 ★Jeff Remick, Warren, MI
9,650 Benoit Landry, Drummondville, Quebec
9,450 Phillip Holsten, Modesto, CA

BIOSPHERE *(Radio Shack)*
423 ★Ken Cikas, Sherman, IL

BUZZARD BAIT *(Tom Mix)*
22,931,850 ★Skip Taday, East Lyme, CT
763,550 Geran Stalker, Rivordalo, GA
187,750 Keith Janas, Kitwanga, British Columbia

CANYON CLIMBER *(Radio Shack)*
1,627,500 ★Matthew Fumich, Munford, TN
202,000 David Brown, New Waterford, Nova Scotia
178,200 Darren King, Yorkton, Saskatchewan
169,000 Gregory Speer, Emporia, KS
165,500 Sara Mittelstaedt, Kiel, WI
159,200 Upton Thomas, Arnold, MD
157,200 Emmett Keyser, Napa, CA

CAVE WALKER *(Radio Shack)*
38,120 ★Steve Stratton, Norfolk, VA

CLOWNS & BALLOONS *(Radio Shack)*
688,960 ★Faye Keefer, Augusta, GA
70,180 Charles Andrews, Delta Jct, AK
36,650 Melody Webb, Lakeport, CA
15,950 Matthew Smith, Courtenay, British Columbia

COLOR POKER (THE RAINBOW, 4/83)
27,003,600 ★Earl Foster, Lynchburg, VA

DALLAS QUEST *(Radio Shack)*
81 ★Brad Wilson, Lithia Springs, GA
85 David and Shirley Johnson, Leicester, NC
86 Roy Grant, Toledo, OH
86 Melanie Moor, Florence, AL
86 Paul Summers, Orange Park, FL
87 Douglas Bell, Duncan, OK
89 Chris Piche, White Rock, British Columbia
89 Milan Parekh, Fullerton, CA
89 Andrew Urquhart, Metairie, LA
89 Steve Zemaitis, Howell, MI

DECATHALON *(Spectral Associates)*
10,400 ★Tom DiVittorio, Glassboro, NJ
7,440 Wayne Hufford, Kincardine, Ontario
7,216 Martin Parada, Arcadia, CA

DEFENSE *(Spectral Associates)*
16,305 ★Patrick Martel, Laval, Quebec

DEF MOV (THE RAINBOW, 1/87)
43,806 ★Domingo Martinez, Miami, FL
35,331 David Schaller, Clarkston, WA
31,673 Douglas Bacon, Middletown, CT
30,253 Benoit Landry, Drummondville, Quebec
25,739 John Weaver, Amsterdam, NY

DEMON ATTACK *(Imagic)*
72,410 ★Glenn Hodgson, Aberdeenshire, Scotland
67,760 Jim Davis, Sandwich, IL
40,435 Upton Thomas, Arnold, MD
28,780 Daniel Streidt, Cairo, Egypt
16,995 Todd VanNatta, Isle of Palms, SC

DESERT RIDER *(Radio Shack)*
80,703 ★Thomas Payton, Anderson, SC
62,702 William Currie, Bryans Road, MD
50,797 Patrick Devitt, Lombard, IL
26,125 Ryan Grady, Newbury Park, CA
24,355 Roby Janssen, Clear Lake, IA

DEVIL ASSAULT *(Tom Mix)*
1,866,100 ★Stephane Martel, Laval, Quebec
623,550 Dale Krueger, Maple Ridge, British Columbia
75,000 Blake Cadmus, Reading, PA
40,800 Benoit Landry, Drummondville, Quebec

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52,600 Eric Olson, Wheaton, IL

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172,320 ★Richard Winkelbauer, Bronx, NY
136,510 Don Mullis, Delavan, WI
51,470 Betty Mullis, Delavan, WI
50,700 Tristan Terkuc, Richmond, Ontario
34,990 Darren Lowe, White Rock, British Columbia

DOWNLAND *(Radio Shack)*
99,980 ★Danny Wimett, Rome, NY
98,985 Karl Gulliford, Summerville, SC
97,740 Stephane Deshaies, Beloeil, Quebec
89,490 Neil Edge, Williston, FL
77,254 Tom Audas, Fremont, CA
73,346 Jean-Francois Morin, Loretteville, Quebec
70,142 Chris Goodman, Baltimore, MD
68,142 Cooper Valentin, Vavenby, British Columbia
67,721 Keith Yampanis, Jaffrey, NH
62,442 Eddie Lawrence, Pasadena, Newfoundland
55,300 Patrico Gonzalez, Buenos Aires, Argentina
49,500 Danny Perkins, Clifton Forge, VA
49,441 Kevin Pater, Port Alberni, British Columbia
49,254 David Brown, New Waterford, Nova Scotia
43,502 Mike Ells, Charlotte, MI
41,896 Antonio Hidalgo, San Jose, Costa Rica
40,360 Jesse Binns, Phoenix, AZ
34,424 Andrea Mayfield, Melbourne, FL
25,148 Michelle Murray, Salem, IN
25,147 Timothy O'Neal, Commerce, TX
22,739 Kyle Sheppard, Fairview, NC
19,708 Clifford Lingle, Overland Park, KS

DRAGON FIRE *(Radio Shack)*
160,835 ★Eric Olson, Wheaton, IL
146,325 Stephane Martel, Laval, Quebec
9,861 Michael Adams, Columbia, SC
9,200 Jesse Cogdell, Wilmington, DE
5,561 Chris Lorenz, Kiester, MN

DRAC *(Tom Mix)*
104,850 ★Don Mullis, Delavan, WI

ESCAPE 2012 *(Computerware)*
202 ★Roy Grant, Toledo, OH
199 Milan Parekh, Anaheim, CA

FIRE COPTER *(Adventure International)*
77,030 ★Mike LeBrun, Cornwall, Ontario
56,840 Michael Adams, Columbia, SC

FIRESTORM (THE RAINBOW, 1/86)
22,505 ★Chad Presley, Luseland, Saskatchewan
11,250 Stephane Martel, Laval, Quebec
5,680 Kathy Rumpel, Arcadia, WI
3,760 Rick Beevers, Bloomfield, MN
3,505 Blake Cadmus, Reading, PA

GALACTIC ATTACK *(Radio Shack)*
26,370 ★Jeff Remick, Warren, MI
10,600 Brian Crabtree, College Park, WA
9,930 Daniel Streidt, Cairo, Egypt

GALACTIC FIGHTER *(Four Star Software)*
153,725 ★Michael Heitz, Chicago, IL

GALAGON *(Spectral Associates)*
357,890 ★Jason Clough, Houston, TX
328,820 Bernard Burke, Lee's Summit, MO
249,960 Matthew Fumich, Munford, TN
169,410 Danny Dunne, Pittsfield, NH
149,520 Vernon Johnson III, Parkville, MD

GALAX ATTACK *(Spectral Associates)*
236,350 ★Corey Leopold, Nada, TX
28,300 Augusto Voysest, Lima, Peru

GANTELET *(Diecom Products)*
23,643,720 ★Geran Stalker, Rivordalo, GA
20,921,490 Randall Edwards, Dunlap, KS
10,222,940 Clinton Morell, Sacramento, CA
10,020,500 Ken Hubbard, Madison, WI
7,493,340 Stirling Dell, Dundalk, Ontario
2,626,950 Jonathon Ross, Pocomoke City, MD
2,512,620 Jason Steele, Pensacola, FL
2,312,640 Rory Kostman, Hershey, NE
2,115,790 Jerry Honigman, Waggoner, IL
2,011,200 Jerry Colbert, Bakersfield, CA
1,245,550 Donald Cathcart, Halifax, Nova Scotia
1,224,190 Jonathan Wanagel, Freeville, NY

GHANA BWANA *(Radio Shack)*
2,350,750 ★Michael Heitz, Chicago, IL
702,520 Joseph Delaney, Augusta, GA
105,820 David Reash, Hadley, PA

GIN CHAMPION *(Radio Shack)*
1,074 ★William Ehardt, Darien, IL

GROBOT *(Children's Computer Workshop)*
8,090 ★Curt Lebel, Louisville, KY

HITCHHIKER'S GUIDE TO THE GALAXY *(Infocom)*
400/422 ★Jeff Holtham, Waterloo, Ontario
400/510 Brad Wilson, Lithia Springs, GA

INTERBANK INCIDENT *(Radio Shack)*
4,861 ★Shara and Chris Euton, Lilburn, GA

IRON FOREST *(Diecom Products)*
1,013,100 ★William Weller, Kailua, HI

JOKER POKER (THE RAINBOW, 3/87)
8,179,710 ★Brenda Kim, Athens, OH
2,793,285 Blain Jamieson, Kingston, Ontario
205,239 Paul Dykes, Baton Rouge, LA
13,377 Jason Ebbeling, Berkshire, MA
4,488 Frankie DiGiovanni, Olney, MD

SCOREBOARD

JUNIOR'S REVENGE *(Computerware)*
2,503,000 ★Stephane Martel, Laval, Quebec
257,600 Keith Cohen, Rocky Mount, NC

JUNKFOOD (THE RAINBOW, 11/84)
25,670 ★John Guptill, Columbia, MO
18,650 Daniel Streidt, Cairo, Egypt

KARATE *(Diecom Products)*
31,000 ★Wayne Hufford, Kincardine, Ontario
11,600 Jonathon Ross, Pocomoke City, MD
6,300 David Darling, Longlac, Ontario

KING TUT *(Tom Mix)*
44,500 ★Curt Lebel, Louisville, KY

KORONIS RIFT *(Epyx)*
186,710 ★Tony Harbin, Cullman, AL
184,180 Russell Johnson, Sarnia, Ontario
184,120 John Farrar, Lebanon, TN
174,810 Donald Cathcart, Halifax, Nova Scotia
133,990 Paul Blessing, Spring, TX

KUNG-FU DUDE *(Sundog Systems)*
32,000 ★Tony Geitgey, University Park, PA
12,150 Cody Deegan, Fallon, NV

LUNAR RESCUE (THE RAINBOW 8/87)
260,427 ★Tom Beeker, Gracey, KY
259,493 Cody Deegan, Fallon, NV
246,668 Phillip Holsten, Modesto, CA
175,771 Jim Davis, Sandwich, IL
113,579 Jeff Remick, Warren, MI

LUNCHTIME *(Novasoft)*
135,500 ★Robert Ritter, Minneapolis, MN

MAGIC OF ZANTH *(Computerware)*
47 ★Robert Williams, Yellowknife, Northwest Territory

MEGA-BUG *(Radio Shack)*
9,016 ★Heather Richwalski, Medford, WI
8,199 Eric Mellon, Newark, DE
5,528 Douglas Bacon, Middletown, CT
5,172 Jason Ebbeling, Berkshire, MA

MISSION: F-16 ASSAULT *(Diecom Products)*
468,750 ★Karen Jessen, Cleveland, OH
355,570 Stirling Dell, Dundalk, Ontario
318,160 Jeremy Pruski, Sandwich, IL
144,510 Donald Cathcart, Halifax, Nova Scotia
137,920 Mike Grant, Fresno, CA

MOON HOPPER *(Computerware)*
82,150 ★Clifford Lingle, Overland Park, KS
55,270 David Reash, Hadley, PA

MUNCHKIN BLASTER (THE RAINBOW, 8/87)
11,950 ★Jim Davis, Sandwich, IL
10,420 Gabe Emerson, Baraboo, WI
9,760 Tom Beeker, Gracey, KY
9,080 John Weaver, Amsterdam, NY
9,000 Benoit Landry, Drummondville, Quebec

OMNIVERSE *(Computerware)*
109 ★Milan Parekh, Anaheim, CA

ONE-ON-ONE *(Radio Shack)*
1,302-0 ★●Thomas Payton, Anderson, SC
1,276-0 ●Jonathan Dorris, Indianapolis, IN
1,242-0 ●William Currie, Bryans Road, MD
1,210-0 ●Gregg Thompson, Chesterfield, VA
1,204-0 ●Chad Johnson, Benton, AR
1,160-0 ●Mark Lang, Downieville, CA

PARAMISSION (THE RAINBOW, 5/87)
3,500 ★Jim Davis, Sandwich, IL
3,200 Jeff Remick, Warren, IL

PEGASUS AND THE PHANTOM RIDERS *(Radio Shack)*
329,000 ★Joseph Delaney, Augusta, GA
303,100 Mike Grant, Fresno, CA
261,000 Domingo Martinez, Miami, FL
67,100 Ryan Grady, Newbury Park, CA

PINBALL *(Radio Shack)*
399,350 ★Troy Stoll, Washington, IN
389,463 Thomas Payton, Anderson, SC
213,300 Patrick Martel, Laval, Quebec
142,400 Thomas Payton, Anderson, SC

PITSTOP II *(Epyx)*
54 ★Rusty Breitbach, Rickardsville, IA
54 ★Jeff Coburn, Easton, PA
54 ★Walter Hearne, Pensacola, FL
54 ★Thomas Payton, Anderson, SC
54 ★Jeff Szczerba, Sturtevant, WI
54 ★Sean Noonan, Green Bay, WI
54 ★Brad Wilson, Lithia Springs, GA
51 Christian Grenier, Valleyfield, Quebec
49 Randy Venable, Coal City, WV
14 Eric Mellon, Newark, DE
9 Laundre Clemon, Sacramento, CA

POLARIS *(Radio Shack)*
919,085 ★Clinton Terry, Toronto, Ontario

POLTERGEIST *(Radio Shack)*
4,855 ★Darren Lowe, White Rock, British Columbia

POOYAN *(Datasoft)*
34,000 ★Ken Cikas, Sherman, IL

POPCORN *(Radio Shack)*
94,470 ★Patrick Martel, Laval, Quebec
44,010 Kevin Pater, Port Alberni, British Columbia
25,850 Matthew Leitman, Beaconsfield, Quebec
16,720 Michael Bacon, Mt. Vernon, IN

PYRAMID *(Radio Shack)*
220 ★Jason Ebbeling, Berkshire, MA

PYRAMID 2000 *(Radio Shack)*
220 ★Darren King, Yorkton, Saskatchewan
100 Peter Antonacopoulos, Toa Baja, Puerto Rico

PYRAMIX *(ColorVenture)*
17,170 ★Janet Kim, Pinckneyville, IL

QUIX *(Tom Mix)*
8,407,772 ★John Haldane, Tempe, AZ
1,404,000 Curtis Goodson, Sao Paulo, Brazil
1,201,383 Milan Parekh, Anaheim, CA
1,003,104 Elisa Goodson, Sao Paulo, Brazil
326,192 Martin Parada, Arcadia, CA

RADIO BALL *(Radio Shack)*
399,999 ★Eric Mellon, Newark, DE

RESCUE ON FRACTALUS *(Epyx)*
288,084 ★Donald Cathcart, Halifax, Nova Scotia
270,000 Russell Johnson, Sarnia, Ontario
190,915 Leon Beggs, Bellingham, WA
167,947 Roger Smith, High Prairie, Alberta
148,932 Mike LeBrun, Cornwall, Ontario

RETURN OF JUNIOR'S REVENGE *(Colorware)*
1,792,800 ★Chad Presley, Luseland, Saskatchewan

RETURN OF THE JET-I *(ThunderVision)*
309,250 ★Melody Webb, Lakeport, CA

ROGUE *(Epyx)*
43,222 ★Hans Lutenegger, Madison, IA
27,542 Melanie Lapoint, Fitchburg, MA
21,682 Paul Blessing, Spring, TX
17,851 Yvan Langlois, Laval, Quebec
8,812 Allen Houk, San Diego, CA

SAILOR MAN *(Tom Mix)*
1,019,200 ★Gabriel Assel, Cameron, MO
341,800 Jason Clough, Houston, TX
332,600 Jeremy Carter, Spring Lake Park, MN
287,200 Patrick Devitt, Lombard, IL

SANDS OF EGYPT *(Radio Shack)*
67 ★Tristan Terkuc, Richmond, Ontario
82 Edward Rocha, Cobleskill, NY
86 Roy Grant, Toledo, OH
87 Neil Haupt, Elyria, OH
117 John Lente, Austin, TX

SAUCER DEFENSE *(THE RAINBOW, 4/87)*
4,000 ★Frankie DiGiovanni, Olney, MD

SHAMUS *(Radio Shack)*
16,410 ★Steve Stratton, Norfolk, VA

SHOOT'N RANGE (THE RAINBOW, 8/87)
13,794 ★Phillip Holsten, Modesto, CA
5,998 Richard Winkelbauer, Bronx, NY
5,433 Benoit Landry, Drummondville, Quebec

SPACE ASSAULT *(Radio Shack)*
13,110 ★Jeff Remick, Warren, MI
6,200 John Weaver, Amsterdam, NY

SPEED RACER *(MichTron)*
81,020 ★Wayne Hufford, Kincardine, Ontario

SPEEDSTER (THE RAINBOW 8/87)
32,110 ★Lisa Williamson, Watauga, TX
26,190 Melissa Clayton, Hoosick Falls, NY
22,750 Benoit Landry, Drummondville, Quebec
10,500 Sara Mittelstaedt, Kiel, WI
4,710 Andrea Reelitz, Greenville, IL

STRATEGY FOOTBALL (THE RAINBOW, 8/83)
153-0 ★Michael Heitz, Chicago, IL

STORM *(Computerware)*
113,315 ★Tony Bacon, Mt. Vernon, IN
69,645 Michael Bacon, Mt. Vernon, IN

SUCCESS MANSION (THE RAINBOW, 1/87)
13/13 ★Dave Allessi, Iselin, NJ

SUPER ROOTER (THE RAINBOW, 5/86)
15,180 ★Richard Donnell, Penns Grove, NJ
11,090 Frederick Lajoie, Nova Scotia, Canada
3,910 Daniel Bradford, Birmingham, AL

TEMPLE OF ROM *(Radio Shack)*
303,600 ★Tim Hennon, Highland, IN
138,400 Gary Budzak, Westerville, OH
125,200 Michelle Murray, Salem, IN

THEXDER *(Sierra On-Line)*
195,000 ★Emmett Keyser, Napa, CA
192,600 Frankie DiGiovanni, Olney, MD

TREASURE QUEST (THE RAINBOW, 11/86)
29,340 ★Matthew Smith, Courtenay, British Columbia

TREKBOER *(Mark Data)*
132 ★Matthew Fumich, Munford, TN
123 Roy Grant, Toledo, OH

TUT'S TUMB *(Mark Data)*
118,720 ★Reina Roy, Carleton, Quebec
74,780 Mack Haynes, Nice, CA
72,000 Chad Presley, Luseland, Saskatchewan
60,020 Don Siler, Muncie, IN
45,000 Blake Cadmus, Reading, PA

VARLOC *(Radio Shack)*
2,032 ★Tony Harbin, Cullman, AL
2,032 ★Edward Rocha, Cobleskill, NY
2,008 Philip Puffinburger, Winchester, VA
1,995 Denise Rowan, Minneapolis, MN
1,991 Ryan Grady, Newbury Park, CA
1,988 Randall Edwards, Dunlap, KS
1,975 Bernard Florence, Croydon, Australia
1,951 Gary Haggard, Cedar Hill, TX

VICIOUS VIC (THE RAINBOW, 7/86)
18,813 ★Talib Khan, Bronx, NY
11,902 Martha James, Swarthmore, PA
10,489 Karl Gulliford, Summerville, SC
6,294 Pat O'Neill, Nepean, Ontario
4,643 Martha James, Swarthmore, PA
3,285 Richard Donnell, Penns Grove, NJ

THE VORTEX FACTOR *(Mark Data)*
100/276 ★Tommy Crouser, Dunbar, WV
100/483 Rick & Brenda Stump, Laureldale, PA
210 Paul Maxwell, Vancouver, British Columbia

WARP FACTOR X *(Prickly-Pear)*
10,577,051 ★Doug Lute, Clymer, PA

WISHBRINGER *(Infocom)*
400/201 ★Brad Wilson, Lithia Springs, GA

WRESTLE MANIAC *(Diecom)*
956,971 ★Marc Reiter, Cincinnati, OH
546,315 Louis Bouchard, Gatineau, Quebec
45,483 Tony Bacon, Mt. Vernon, IN
42,105 David Brown, New Waterford, Nova Scotia
39,086 Billy Helmick, Independence, KY

ZAKSUND *(Elite Software)*
357,550 ★Martin Parada, Arcadia, CA
268,350 Tony Bacon, Mt. Vernon, IN
44,900 Michael Adams, Columbia, SC
39,950 Walter Hearne, Pensacola, FL

ZAXXON *(Datasoft)*
2,061,000 ★Byron Alford, Raytown, MO
1,950,000 Blake Cadmus, Reading, PA
1,300,500 Dan Brown, Pittsford, NY
1,100,600 Andrew Urquhart, Metairie, LA
253,400 Bob Dewitt, Blue Island, IL
170,600 Matthew Yarrows, East Hampton, MA
163,700 Daniel Bradford, Birmingham, AL
137,200 Upton Thomas, Arnold, MD
112,000 Ken Cikas, Sherman, IL

ZONERUNNER *(Radio Shack)*
65,535 ★Donald Cathcart, Halifax, Nova Scotia

ZONX (THE RAINBOW, 10/85)
6,500 ★Daniel Streidt, Cairo, Egypt

ZUES *(Aardvark)*
3,380 ★Martin Kertz, Forrest City, AR

— Jody Doyle

SCOREBOARD POINTERS

In conjunction with THE RAINBOW's Scoreboard, we offer this column of pointers for our game-playing readers' benefit. If you have some interesting hints, tips or responses to questions, or want help yourself, we encourage you to write to the Scoreboard, c/o THE RAINBOW.

Feedback

In response to questions from:

• Greg Fields: To get the scepter in *Sands of Egypt*, you must get the dates and feed them to the camel. Examine the carving on the statue and oil the scepter, then pull the scepter.

• Rick Moore: To get down the ladder in *Dallas Quest*, you must put all the items in the knapsack and type DROP SACK. After you drop the sack, get the flashlight and type CLIMB LADDER, LIGHT LIGHT and DROP LIGHT. After you drop the light, go back to the store and get your sack.

• Brian Hill: To get the torch in *Sands of Egypt*, first you go back to the base of the cliff and go south twice.

In *Sands of Egypt*, I cannot find a way to get the palm fronds. I also do not understand where I can find the ax. What is the ax used for?

In *Dallas Quest*, I am in the cave after you wave the ring to the cannibals. How do I get out?

In *White Fire of Eternity*, I am in the Shrine of Sorts. How do I get the pick? How do I open the box?

Mike Duvall
Zanesville, OH

• Robert Johnston: After you drug the first spider in *Trekboer* type GET SPIDER, then put the spider in the room where the plant is. Type GET PLANT and leave the room. Press the button; this should take care of the second spider.

• Phil Derksen: In *Planetfall*, to get the key, try using the bar. It's "magnetic."

How do you get past the stone gargoyle in *Raaka-Tu*? How do you get past the rug? Is there any way past the gates on the west wall? Are there any other secret passages other than under the altar? What do I do when I leave the secret passage under the altar?

Jim Price
Penetanguishene, Ontario

Scoreboard:

In *Dungeons of Daggorath*, the fastest way to get your shots in is to have your sword in your left hand. That way, you can put your left index finger on the A key, your right thumb on the space bar, your right index finger on the L key and your right middle finger on the ENTER key. Now you can "roll" your hands and fill the buffer up with "AL," short for "Attack Left." Once you have the ring on the first level, type I FIRE to get the power of it. Then save it for Level 2.

How do you get ice out of rime? What exactly is the strategy to get the wizard's image on level three and what do the Wraiths and Galdrogs sound and look like?

James Wilcox
Rockland, ME

Scoreboard:

I have killed the wizard's image in *Dungeons of Daggorath*, and after that I'm transported to the fourth level with the things I had in my hands and the torch I'm using. Everything else disappears. The wizard's image also leaves a scroll. How do I get all my stuff back and the scroll?

Mark Fernandez
N. Dartmouth, MA

Scoreboard:

In *Dungeons of Daggorath*, on Level 2, how do you kill the evil knight and how do you get to all six levels? Can you climb up the ladder or can you just climb down? How do you use the rings?

Mike Walter
Wilmington, NC

Scoreboard:

In *Sands of Egypt*, to get the magnifier you must go south from the bottom of the cliff and dig. How do I get the torch and the container? How do I get the palm fronds?

Joe Martinez
Pullman, WA

Scoreboard:

In *Dallas Quest*, to get by the natives, type WAVE RING. Once you've killed the spider, put the ring in the statue's eye and something will fall out of the statue's mouth.

In *Pyramid*, where is the sarcophagus? In *Shenanigans*, where is the pocket knife? In *Sands of Egypt*, where is the torch?

Jaan Laansoo
Barrie, Ontario

Scoreboard:

In *Dallas Quest*, how do you get past the dinghy boat and get on it? When you do get past it, what do you do?

In *One-On-One*, how do you shatter the backboard and get three points?

Stephen Wallis
Beverly, MA

Scoreboard:

In *Sea Quest*, supposedly you have to go east from the stairs, dig and get the mirror. But when I try to dig, it says, "With my hands? Surely you jest!"

In *Calixto Island*, when you get to a place with the tombstone and pagan idol, what do you do? What do you do when you get back to shore where the shack is?

In *Black Sanctum*, how do you know when the computer will all of a sudden take you to a strange place where your body feels paralyzed? What is the use of the woman's hair?

Timothy Bishop
Jacksonville, FL

Scoreboard:

In *Pyramid 2000*, water the plant and climb it. I read in "Scoreboard Pointers" that the scepter bridges a gap. Where is this gap? Where is the mummy's treasure chest?

In *Escape 2012*, how do you get out of the alien base and how do you build the bomb?

In *Sam Sleuth P.I.*, how do you solve the bank robbery?

Philip Manwarren
Harrington, ME

Scoreboard:

In *Pyramid 2000*, how do you give the little plant water?

In *Madness and the Minotaur*, how do you get the magic sword, spell book, truth or light ring?

Joe Szewczyk
Eagle River, WI

Scoreboard:

In *Robot Odyssey*, how do you get the ticket needed to get to the next level?

In *Wild West*, how do you dynamite without blowing yourself up?

In *Treasure of the Aztecs*, how do you get the rod out of the hut without getting speared?

In *Escape 2012*, how do you get past the guard droid?

Chad Presley
Luseland, Saskatchewan

Scoreboard:

To get past the bugblatter beast in *Hitchhiker's Guide to the Galaxy*, get the stone, put the towel on your head, carve Arthur Dent in the memorial and remove the towel.

In *Zork I*, the scepter will turn the rainbow into stairs.

In *Planetfall*, where is the radiation suit, and what do you do to the mural?

Ray Knoch
Lawson, MO

Scoreboard:

In *Hitchhiker's Guide to the Galaxy*, how do you kill the bugblatter beast of Traal, and how do you get past the screening door?

Richard Hawley
Honolulu, HI

Scoreboard:

In the *Interbank Incident*, I have found both keys, the rope, the computer, the disk, the cartridge, the transmitter and pipe, and the code book. But what do I do now?

Nick Rocco
Throop, PA

Scoreboard:

In *Vortex Factor*, how do I find the cartridge that takes me to London? How do I open the safe behind the calendar and how do I open the north doors? I have the red, yellow, pink and white cartridges.

Matt Buffalow
Walla Walla, WA

Scoreboard:

In *Raaka-Tu*, how do I get past the rug with the spiked pit?

Benoit St-Jean
Gatineau, Quebec

Scoreboard:

In *Raaka-Tu*, I cannot get by the gargoyle. I have found the coin, food, sword and the ring.

Troy Ferguson
Dease Lake, British Columbia

Scoreboard:

In *Madness and the Minotaur*, going south is the direction that almost always leads to the maze, but is not the only direction that leads to the maze.

In *Rogue*, don't drink two potions of Haste Self in succession because a flaw in the game will cause the computer to lock up and you'll lose your game.

In *The Magic of Zanth*, how do you open the bottle?

In *Raaka-Tu*, what do you do after you've killed the gargoyle and the snake and found the secret passage that leads back to the outside of the temple?

Steve Moore
Ontario, CA

Scoreboard:

In *Shenanigans*, to get to the clover field, you must go to where the unicorn horn is. Go east until you see "Obvious exits are: north, south, east, west." Type EAST and you will be in the clover field.

In *Sea Quest*, to find the last treasure, go where the deflated balloon is and go east. When you have all your treasures, go to your cave and drop them.

In *Raaka-Tu*, how do you get over the rug and where do you finish this Adventure?

Benoit St-Jean
Gatineau, Quebec

Scoreboard:

In *Shenanigans*, how do you get past the ravine in the cave?

Andrew Bryan
Springhill, Nova Scotia

Scoreboard:

In *Gates of Delirium*, how do I get to the Shrines and where can I find people to join my party? What's in the dungeons?

Dan Breault
Chicopee, MA

Scoreboard:

How do you get past Chamber 8 in *Downland* without getting killed on the rope at the top of the screen?

Jim Barkel
Zeeland, MI

Scoreboard:

I can't get into the tunnel in *Black Beard's Island*. I know that you go up to the cliff and type MOVE SIGN and it reveals a hidden tunnel, but how do you get into the tunnel?

Keith Janas
Kitwanga, British Columbia

Scoreboard:

After I deactivate the laser bars in *Escape 2012*, I cannot seem to get past the guard. I type HELP, but that doesn't work.

Will Patterson
Jacksonville, FL

Scoreboard:

In *Double Back*, to get the most amount of available points, let the moving objects, such as the magnets, move around the board until they build into one object. Then, circle them all at once. This will double the score for each object there.

Don Mullis
Delavan, WI

Scoreboard:

In *Gold Runner*, how do you get past Level 19? I have yet to find a way to collect the gold in the center block wall and then get out!

Monte Napper
Houston, TX

Scoreboard:

To all *Caladuril Flame of Light* players:

More thorough research into the chronicles scribed at the time of Jayen Tarinson and his adventures revealed two enigmatic verses apparently written by previous foes of Silmnoleh, Darker Lord of Fire.

The first pertains to "playces undergrounde," and reads as follows:

You're stuck at a door, too bad!
Your're stuck at a door, too right!
But don't you give up too soon,
There may be illusion, to right!

The second was found, we have discovered, scrawled on the wall of an iron castle:

Drop it near the dimmering depths.
You'll need it if you pass the steps.
But you can't take it when you go,
That wooden shield that aids you so.

Our own research has failed to reveal the meanings of these two verses; we publish them here in the hope they will aid other, braver Adventurers.

Jeff Noyle
Dave Triggerson
Georgetown, Ontario

To respond to other readers' inquiries and requests for assistance, reply to "Scoreboard Pointers," c/o THE RAINBOW, P.O. Box 385, Prospect, KY 40059. We will immediately forward your letter to the original respondent and, just as importantly, we'll share your reply with all "Scoreboard" readers in an upcoming issue.

For greater convenience, "Scoreboard Pointers" and requests for assistance may also be sent to us through the MAIL section of our Delphi CoCo SIG. From the CoCo SIG> prompt, pick MAIL, then type SEND and address to: EDITORS. Be sure to include your complete name and address.

When you're bogged down in the CoCo marshes . . .

Swamp Think

By Joseph Kolar
Rainbow Contributing Editor

Last month, we had a lot of fun with Lo-Res graphics borders. It was an enjoyable session. For an encore, I decided to continue our exploratory trip to see where this extended lesson would lead us.

From past experience, I know that the trail will peter out and we will get mired down in a CoCo swamp that has oodles of dead ends. The fun is in the journey and the computer flora and fauna that we check out along the way.

We pretended we were a bunch of CoConauts, beginning our safari through the tangle of BASIC jungle lore. Now that we are veteran bordermakers, load MARQUEE1, which last month you were invited to save.

The first idea perking away is of a double border. How to proceed? Start with a second row at the top. Type this line:

```
71 'FOR H=2 TO 61 STEP2:SET
(H,2,C):NEXTH
```

Note the temporary masking REM (').

Because a border exists around the perimeter of our screen (that is, two graphics units wide), instead of starting at H=0, we begin at H=2. Instead of ending at H=62, we allow for the right side border and stop at H=61. Since we used two vertical units, 0 and 1, for the top row, we type V=2.

H has shrunk two units at each side and V is pushed down two units. By now, you must have a sneaking suspicion that each graphics square is really a 2-by-2 square. Run. It is evident that the lines we called forth display one colored space and one blank (black) space, racing around the perimeter. The other two spaces, on the second row, are also blank, creating the illusion of a solid, inner border.

As an aside, to fill the first two lines of the top border, we require a nested loop. Rekey Line 70 and run:

```
70 FOR H=0 TO 63:FOR V=0 TO
1:SET(H,V,8):NEXTV,H
```

The inner loop is gone through first, then the outer loop: H=0,V=0;H=0,V=1;H=1,V=0:H=1;V=1 . . . H=63,V=0;H=63;V=1. Run it again and watch it evolve. In the *next* part of the multiple-line statement, V is executed first. It is separated from H, the outer loop, by a comma. Rekey Line 70:

```
70 FOR H=0 TO 63:SET(H,0,8):
NEXTH:FOR V=0 TO 63:SET(H,
1,8):NEXTH
```

Run. Study it and you will see both orange lines become one husky one. Rekey Line 60 for a third way:

```
70 FORH=0TO63:SET(H,0,8):SET
(H,1,8):NEXTH
```

Run the program. To be honest, each method is as good as the next. Which system you select depends on the perspective you bring to CoColand.

Keep this information on tap. We don't want to pack it on at this stage of the journey. However, we may be looking for it later.

Restore the original Line 70:

```
70 FOR H=0TO63:STEP2:SET(H,
0,C):NEXTH
```

Edit Line 71 to get rid of the REM marker ('). Enter EDIT 71, press D (for Delete), then press ENTER. The line is now active! Run to see its effect.

Now, to get the inner, right side border segment doped out, we know that we can work on H=61, and the vertical column can begin at V=2 and end at V=29. The V length has shrunk at both ends. Enter this line and run:

```
81 FOR V=2TO29STEP2:SET(61,
V,C):NEXTV
```

Compare the paired lines, lines 70 and 71 and 80 and 81. This should suggest what shape Line 91 should take:

```
91 FORH=61TO2 STEP-2:SET(H,
29,C+1):NEXTH
```

Run, and note that C+1 was utilized to change colors.

At this point, create a suitable Line 101. Check listing TRIPLE for my version. Run.

My mind is intrigued with a third inner border. But, enough of two rows of colored light bulbs. I want the inner row to be a moving, colored neon tube.

Refer to TRIPLE, lines 72, 82, 92 and 102. Again, the FOR lines are compressed by two more units at each end. The other end decreases or increases by two, depending on the direction traveled. We are using STEP-1 when the FOR value is decreasing as it is executed. It is omitted in the ascending FOR values because STEP+1 (STEP1) is the default mode. If it makes more sense to you, be my guest, and include it in lines 72 and 82.

Key in the four lines and run.

A lot of jungle paths are tempting me. What about a STEP-3 variant? How about an outside STEP-1 border? How about a convoluted square working to the center of the screen? (Save TRIPLE now.)

Now convert the outer border, lines 70, 80, 90 and 100, so that they sandwich the light bulbs (middle row). Merely edit each of the four lines to STEP1 or STEP-1. For example, enter EDIT70 and press the space bar until the cursor is over the 2 of STEP2. Maybe we ought to make the third variable, denoting color, agree in the neon lines (C and C or C+1 and C+1). Run.

This variant is OK, but it lacks pizazz. What if we checked the neon lines and made all C+1 variables into C variables? Run when ready. This version doesn't do anything for me.

Try this: Rekey Line 65 as 65 FOR C=1 TO RND(8) and run. This will run itself

Florida-based Joseph Kolar is a veteran writer and programmer who specializes in introducing beginners to the powers of the Color Computer.

out and display a fairly well-balanced, colored border. Line 65 could be written like this and produce the same result: `65 FOR C=RND(1) to RND(8)`. Run the program.

Stop as you work along with me and save anything that suits your fancy. At this stage, I am changing Line 0 to `0 '<TRIPLEA>` and making a copy before I get lost.

Another trail to explore is that of making the light bulb row circulate in the opposite, counterclockwise direction. This involves lines 71, 81, 91 and 101. The FOR part of the line must be reversed, STEP+2 changed to STEP-2, and STEP-2 changed to STEP+2.

Restore Line 65 as `65 FOR C=1TO8` and run. Something is wrong! Now add the "title line" `0 'WACKY` and save the program as WACKY, if you like. Can you see where I wandered down the primrose path?

I had to camp out in this dismal swampland and work out proper lines 71, 81, 91 and 101: Merely change Line 81 to 101 and 101 to 81. Change C+1 to C in lines 81 and 91. All the color-set values will be the same. Line 66 should now be inoperative. Mask it and run to see if this is true. The program goes into a dizzying perpetual loop when it hits orange, Color 8. As it stands, the display is no earth-shatterer.

For variety, let's turn the outer border into a light bulb border. Change the four 1s to 2s in the STEP, lines 70, 80, 90 and 100. Run. This, too, poops out with an orange border.

Suppose the outer border were STEP-3 or +3? Try it! Run it! Give it a title line: `0 'WACKYA`.

You can put these few programs into perpetual color recycling.

Edit Line 200 by entering `EDIT200`. Press X to jump to the end of the line, then backspace three characters. Type `65`, press ENTER, and run. Easier still, rekey Line 200 as `200 GOTO 65` and run.

What if the light bulb (middle row) were changed to a neon sign and the inner one changed to a `STEP 3` to complement the outside row?

First, change the four STEP2 or -2 commands in lines 71, 81, 91 and 101 to STEP+1 or -1, and run. That's not too bad — do you see how I am getting more and more ideas and am sidetracked from exploring other paths pregnant with possibilities?

Remember that routine with a double, solid orange row that we set aside as boring? What if we set the outer border to a nice wide band of living color?

Enter `EDIT70` and press the space bar until the cursor is over the S in STEP. Type 5D (to delete STEP and the space), press I (for Insert) and type `:FOR V=0TO1:`. Press a shifted up arrow to get out of the Insert mode, and advance the space bar until the cursor is over the C. Press C (for Change) and replace the letter by pressing V. Then press the space bar until the cursor is over the final H. Press I, type V,, press ENTER and run.

Edit Line 80 by entering `EDIT80`. Advance the space bar until the cursor is over the S in STEP. Type 6D (to delete six characters) and press I (for Insert). Type `:FOR H=62 to 63` and press a shifted up arrow to get out of the Insert mode. Advance the space bar until the cursor is over the 6 in 63. Press D (for Delete), C (for Change) and H, and advance the space bar until the cursor is over the final V. Press I, type H, press ENTER and run.

At this point, it begins to dawn on me that it might be wiser to execute the outer frame completely, then the middle frame and, finally, the inner frame.

I leave it to you to edit lines 90 and 100. This is designed to give you much-needed practice. Unmask Line 65 (remove the REM marker). Finally, change C to C+1 in lines 70, 80, 90 and 100. In the unlikely event that you get hung up, refer to listing WACKYB.

On one of my meandering treks, I modified TRIPLE. See TRIPLEA. This has two rows of light bulbs with an inner neon sign. Compare each triplet (lines 70 to 72, 80 to 82, etc.). Can you spot the camouflaged changes? Note that the numeral variable in the SET statement in lines 72 and 102 was a 5 instead of the expected 4; in Line 82, 58 instead of 59; and in Line 92, 26 instead of 27. This gives a colored (as opposed to black) inner border segment. Why is this so?

I am dead-ending in cul-de-sacs on all trails that intrigued me. However, I want to try to make a convoluted STEP2;STEP-2 border that ends up in the middle of the screen. I will start you off on this insane race to nowhere.

In listing TRIPLE1, delete some lines by typing the following: `DEL71-72`, `DEL81-82`, `DEL91-92` and `DEL101-102`. Run.

Edit Line 100, advancing the space bar until the cursor is over the first 0. Press C, type 2, press ENTER, and run. Enter `RENUM 400,110,10` to renumber the lines, and add these lines:

```
110 FOR H=2 TO 61 STEP2:SET
(H,2,C):NEXTH
120 FOR V=2 TO 29 STEP2:SET
(59,V,C):NEXTV
130 FOR H=59 TO 2 STEP-2:SET
(H,29,C):NEXTH
140 FOR V=27 TO 4 STEP-2:SET
(4,V,C):NEXTV
150 FOR H=4 TO 49 STEP2:SET
(H,4,C):NEXTH
```

. . . and so forth.

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If you want to see the imperfect program I created, key in SEASHELL. It has minor flaws; however, since we stumble over exposed roots now and then in our zealous explorations, we exhibit this prize spiral shell, flaws and all.

This is too bizarre for me. I checked all the lines from 70 to 370 and yanked out all the +1s from C+1 variables so that only one color would make its debut at a time. The central area is disturbing, due to the black area. Luckily, the ol' legend was intact. Add these lines and run:

```
251 NEXTC
252 GOTO65
```

Examine the specimen carefully and you will see that there are four light bulbs on the left side and five on the right, zipping around the legend.

Nothing can be satisfactorily adjusted in the rows five above and six below the light bulbs. To maintain the integrity of the three-line title, we must live with this sad state of affairs.

Can we support our legend by including Line 260 into CoCo's mindless race around the legend? We will never find out unless we try it.

Enter LIST-270 and DEL251-252 and 261 NEXTC:GOTO65 and run. Perfect! Now all that is required is to condense the three-text line legend one character-width, and thereby create a left green margin.

Enter LIST-60. Use the Edit mode to raise the TAB value by 1 in lines 30, 50 and 60. Run. Isn't that better? It is time to extract the three periods from the same lines. Do so, with Edit, and run.

Enter EDIT 0 and advance the space bar two spaces. Press H (for Hack) to chop off the title, type RACE and press ENTER. Enter LIST-70 to display the listing up to Line 70. Line 66 must go, as it isn't saying anything to CoCo. Enter DEL66 and run. Save your modification as RACE.

Note that unnecessary lines, 270 out, were not deleted. It costs nothing to include them in your save — and, who knows, we may want them later. With similar logic, rather than delete unused lines, you could consider making them passive with a REM marker. For the newcomer, this may be somewhat confusing. But as you get more time behind the keyboard, you will use REM religiously.

There are many, many ideas to investigate, and you will want to continue to wade through the swamp of the unknown, seeking more variants. I can think of many more.

Each mind is unique. You must have made many discoveries if you put forth the effort last month to explore on your own. If you did, note that a lot of jungle trails and variants you discovered are unlike the ones I found lurking in the dark recesses of my mind. That is as it should be!

As it is, there are so many vine-strewn paths concealing fine variant programs, that you are urged to have RACE handy to continue our super-extended lesson in our next tutorial.

But, this is your day! Keep probing and you will add to your ever-increasing cache of knowledge and amuse yourself, to boot. And if you are running RACE, watch entranced as CoCo breathlessly scoots around the three-liner.

We have been bogged down in the very beginning of BASIC, using very few commands and statements. Even so, you have inspired me to create some neat graphics titles. I hope I have given you a slight push to explore more pathways. Consider how far we have advanced. Just last month we began by creating a blank PRINT line. You have progressed far, but not without setbacks. You have seen that we have barely cleared a small path in the Lo-Res part of BASIC. If we diligently pursue all of our ideas, will we ever get out of Color BASIC? So far, we have used only the EDIT command from Extended Color BASIC.

Next month, we will continue on our bogged-down swamp search. If you are confused with some facets of EDIT, refer to your manual, but rest assured that we shall provide more examples to give you lots of hands-on practice. Join me as we delve deeper into the swamp and seek out creative ideas. Even if we don't find the fountain of youth, we will have found a veritable fountain of valuable CoCo knowledge. □

Listing 1:

```
Ø '<TRIPLE>
1Ø CLS
2Ø FOR X=1 TO 5:PRINT:NEXTX
3Ø PRINTTAB(9)"DOCHITA D. MAY"
4Ø PRINT
5Ø PRINTTAB(7)"51Ø HIGHLANDS AVE
."
6Ø PRINT:PRINTTAB(5)"INVERNESS,
FL., 32652"
65 FOR C=1 TO 8
66 IF C+1=9 THEN C=1
7Ø FOR H=Ø TO 63STEP2:SET(H,Ø,C)
:NEXTH
71 FOR H=2 TO 61 STEP2:SET(H,2,C
+1):NEXTH
72 FOR H=4 TO 59:SET(H,4,C):NEXT
H
8Ø FOR V=Ø TO 31STEP+2:SET(63,V,
C+1):NEXTV
81 FOR V=2 TO 29STEP2:SET(61,V,C
):NEXTV
82 FOR V=4 TO 27:SET(59,V,C):NEX
TV
9Ø FOR H=63 TO Ø STEP-2:SET(H,31
,C):NEXTH
91 FOR H=61 TO 2 STEP-2:SET(H,29
,C+1):NEXTH
92 FOR H=59 TO 4STEP-1:SET(H,27,
C):NEXTH
1ØØ FOR V=31 TO Ø STEP-2:SET(Ø,V
,C+1):NEXTV
1Ø1 FOR V=29 TO 2 STEP-2:SET(2,V
,C):NEXTV
1Ø2 FOR V=27 TO 4STEP-1:SET(4,V,
C):NEXTV
11Ø NEXTC
2ØØ GOTO2ØØ
```

Listing 2:

```
Ø '<TRIPLEA>
1Ø CLS
2Ø FOR X=1 TO 5:PRINT:NEXTX
3Ø PRINTTAB(9)"DOCHITA D. MAY"
4Ø PRINT
```

```
5Ø PRINTTAB(7)"51Ø HIGHLANDS AVE
."
6Ø PRINT:PRINTTAB(5)"INVERNESS,
FL., 32652"
65 FOR C=RND(1) TO RND(8)
66 IF C+1=9 THEN C=1
7Ø FOR H=Ø TO 63STEP1:SET(H,Ø,C)
:NEXTH
71 FOR H=2 TO 61 STEP2:SET(H,2,C
+1):NEXTH
72 FOR H=4 TO 59:SET(H,4,C):NEXT
H
8Ø FOR V=Ø TO 31STEP+1:SET(63,V,
C):NEXTV
81 FOR V=2 TO 29STEP2:SET(61,V,C
):NEXTV
82 FOR V=4 TO 27:SET(59,V,C):NEX
TV
9Ø FOR H=63 TO Ø STEP-1:SET(H,31
,C):NEXTH
91 FOR H=61 TO 2 STEP-2:SET(H,29
,C+1):NEXTH
92 FOR H=59 TO 4STEP-1:SET(H,27,
C):NEXTH
1ØØ FOR V=31 TO Ø STEP-1:SET(Ø,V
,C):NEXTV
1Ø1 FOR V=29 TO 2 STEP-2:SET(2,V
,C):NEXTV
1Ø2 FOR V=27 TO 4STEP-1:SET(4,V,
C):NEXTV
11Ø NEXTC
2ØØ GOTO2ØØ
```

Listing 3:

```
Ø '<WACKYA>
1Ø CLS
2Ø FOR X=1 TO 5:PRINT:NEXTX
3Ø PRINTTAB(9)"DOCHITA D. MAY"
4Ø PRINT
5Ø PRINTTAB(7)"51Ø HIGHLANDS AVE
."
6Ø PRINT:PRINTTAB(5)"INVERNESS,
FL., 32652"
65 FOR C=1 TO 8
66 'IF C+1=9 THEN C=1
7Ø FOR H=Ø TO 63STEP3:SET(H,Ø,C)
:NEXTH
71 FOR H=61TO 2 STEP-2:SET(H,2,C
):NEXTH
72 FOR H=4 TO 59:SET(H,4,C):NEXT
H
8Ø FOR V=Ø TO 31STEP+3:SET(63,V,
C):NEXTV
81 FOR V=2 TO 29 STEP+2:SET(2,V,
C):NEXTV
82 FOR V=4 TO 27:SET(59,V,C):NEX
TV
9Ø FOR H=63 TO Ø STEP-3:SET(H,31
,C):NEXTH
91 FOR H=2 TO 61 STEP+2:SET(H,29
,C):NEXTH
92 FOR H=59 TO 4STEP-1:SET(H,27,
C):NEXTH
1ØØ FOR V=31 TO Ø STEP-3:SET(Ø,V
,C):NEXTV
1Ø1 FOR V=29 TO 2 STEP-2:SET(61,
V,C):NEXTV
1Ø2 FOR V=27 TO 4STEP-1:SET(4,V,
C):NEXTV
11Ø NEXTC
2ØØ GOTO2ØØ
```

Listing 4:

```
Ø '<WACKYB>
1Ø CLS
2Ø FOR X=1 TO 5:PRINT:NEXTX
3Ø PRINTTAB(9)"DOCHITA D. MAY"
4Ø PRINT
5Ø PRINTTAB(7)"51Ø HIGHLANDS AVE
."
6Ø PRINT:PRINTTAB(5)"INVERNESS,
FL., 32652"
65 FOR C=1 TO 8
66 IF C+1=9 THEN C=1
7Ø FOR H=Ø TO 63:FORV=0 TO 1::SE
T(H,V,C+1):NEXTV,H
71 FOR H=61TO 2 STEP-1:SET(H,2,C
):NEXTH
```


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```
72 FOR H=4 TO 59:SET(H,4,C):NEXT
H
8Ø FOR V=Ø TO 31:FOR H=62 TO 63:
SET(H,V,C+1):NEXTH,V
81 FOR V=2 TO 29 STEP+1:SET(2,V,
C):NEXTV
82 FOR V=4 TO 27:SET(59,V,C):NEX
TV
9Ø FOR H=63 TO ØSTEP-1:FORV=3Ø T
O 31:SET(H,V,C+1):NEXTV,H
91 FOR H=2 TO 61 STEP+1:SET(H,29
,C):NEXTH
92 FOR H=59 TO 4STEP-1:SET(H,27,
C):NEXTH
1ØØ FOR H=Ø TO 1:FOR V=31 TO Ø S
TEP-1:SET(H,V,C+1):NEXTV,H
1Ø1 FOR V=29 TO 2 STEP-1:SET(61,
V,C):NEXTV
1Ø2 FOR V=27 TO 4STEP-1:SET(4,V,
C):NEXTV
11Ø NEXTC
2ØØ GOTO65
```

Listing 5:

```
Ø '<SEASHELL>
1Ø CLS
2Ø FOR X=1 TO 5:PRINT:NEXTX
3Ø PRINTTAB(9)"DOCHITA D. MAY"
4Ø PRINT
5Ø PRINTTAB(7)"51Ø HIGHLANDS AVE
."
6Ø PRINT:PRINTTAB(5)"INVERNESS,
FL., 32652"
65 FOR C=1 TO 8
66 IF C+1=9 THEN C=1
7Ø FOR H=Ø TO 63STEP2:SET(H,Ø,C)
:NEXTH
8Ø FOR V=Ø TO 31STEP+2:SET(63,V,
C+1):NEXTV
9Ø FOR H=63 TO Ø STEP-2:SET(H,31
,C):NEXTH
1ØØ FOR V=31 TO 2 STEP-2:SET(Ø,V
,C+1):NEXTV
11Ø FOR H=2 TO 61 STEP2:SET(H,2,
C):NEXTH
12Ø FOR V=2 TO 29 STEP2:SET(61,V
,C):NEXTV
13Ø FOR H=59 TO 2 STEP-2:SET(H,2
9,C):NEXTH
14Ø FOR V=27 TO 4 STEP-2:SET(2,V
,C+1):NEXTV
15Ø FOR H=4TO59 STEP2:SET(H,4,C)
:NEXTH
16Ø FOR V=4TO27 STEP2:SET(59,V,C
):NEXTV
17Ø FOR H=57 TO4STEP-2:SET(H,27,
C):NEXTH
18Ø FOR V=25 TO 6 STEP-2:SET(4,V
,C+1):NEXTV
19Ø FOR H=6TO57 STEP2:SET(H,6,C)
:NEXTH
2ØØ FOR V=6TO25 STEP2:SET(57,V,C
):NEXTV
21Ø FOR H=55 TO 6 STEP-2:SET(H,2
5,C):NEXTH
22Ø FOR V=23 TO6 STEP-2:SET(6,V,
C+1):NEXTV
23Ø FOR H=8TO55STEP2:SET(H,8,C):
NEXTH
24Ø FOR V=8 TO23 STEP2:SET(55,V,
C):NEXTV
25Ø FOR H=53 TO8STEP-2:SET(H,23,
C):NEXTH
26Ø FOR V=21 TO 8STEP-2:SET(8,V,
C+1):NEXTV
27Ø FORH=1ØTO53STEP2:SET(H,1Ø,C)
:NEXTH
28Ø FOR V=1Ø TO21STEP2:SET(53,V,
C):NEXTV
29Ø FOR H=51 TO1ØSTEP-2:SET(H,21
,C):NEXTH
3ØØ FOR V=19 TO 12STEP-2:SET(1Ø,
V,C+1):NEXTV
31Ø FORH=12 TO51 STEP2:SET(H,12,
C):NEXTH
32Ø FOR V=12 TO19 STEP2:SET(51,V
,C):NEXTV
33Ø FORH=49 TO12 STEP-2:SET(H,19
,C):NEXTH
34Ø FOR V=17 TO14 STEP-2:SET(12,
V,C+1):NEXTV
35Ø FORH=14TO49STEP2:SET(H,14,C)
:NEXTH
36Ø SET(49,16,C)
37Ø FOR H=47 TO14STEP-2:SET(H,16
,C):NEXTH
4ØØ NEXTC
41Ø GOTO41Ø
```

Listing 6:

```
Ø '<RACE>
1Ø CLS
2Ø FOR X=1 TO 5:PRINT:NEXTX
3Ø PRINTTAB(1Ø)"DOCHITA D MAY"
4Ø PRINT
5Ø PRINTTAB(8)"51Ø HIGHLANDS AVE
"
6Ø PRINT:PRINTTAB(6)"INVERNESS,
FL, 32652
65 FOR C=1 TO 8
7Ø FOR H=Ø TO 63STEP2:SET(H,Ø,C)
:NEXTH
8Ø FOR V=Ø TO 31STEP+2:SET(63,V,
C):NEXTV
9Ø FOR H=63 TO Ø STEP-2:SET(H,31
,C):NEXTH
1ØØ FOR V=31 TO 2 STEP-2:SET(Ø,V
,C):NEXTV
11Ø FOR H=2 TO 61 STEP2:SET(H,2,
C):NEXTH
12Ø FOR V=2 TO 29 STEP2:SET(61,V
```

```
,C):NEXTV
13Ø FOR H=59 TO 2 STEP-2:SET(H,2
9,C):NEXTH
14Ø FOR V=27 TO 4 STEP-2:SET(2,V
,C):NEXTV
15Ø FOR H=4TO59 STEP2:SET(H,4,C)
:NEXTH
16Ø FOR V=4TO27 STEP2:SET(59,V,C
):NEXTV
17Ø FOR H=57 TO4STEP-2:SET(H,27,
C):NEXTH
18Ø FOR V=25 TO 6 STEP-2:SET(4,V
,C):NEXTV
19Ø FOR H=6TO57 STEP2:SET(H,6,C)
:NEXTH
2ØØ FOR V=6TO25 STEP2:SET(57,V,C
):NEXTV
21Ø FOR H=55 TO 6 STEP-2:SET(H,2
5,C):NEXTH
22Ø FOR V=23 TO6 STEP-2:SET(6,V,
C):NEXTV
23Ø FOR H=8TO55STEP2:SET(H,8,C):
NEXTH
24Ø FOR V=8 TO23 STEP2:SET(55,V,
C):NEXTV
25Ø FOR H=53 TO8STEP-2:SET(H,23,
C):NEXTH
26Ø FOR V=21 TO 8STEP-2:SET(8,V,
C):NEXTV
261 NEXTC:GOTO65
27Ø FORH=1ØTO53STEP2:SET(H,1Ø,C)
:NEXTH
28Ø FOR V=1Ø TO21STEP2:SET(53,V,
C):NEXTV
29Ø FOR H=51 TO1ØSTEP-2:SET(H,21
,C):NEXTH
3ØØ FOR V=19 TO 12STEP-2:SET(1Ø,
V,C):NEXTV
31Ø FORH=12 TO51 STEP2:SET(H,12,
C):NEXTH
32Ø FOR V=12 TO19 STEP2:SET(51,V
,C):NEXTV
33Ø FORH=49 TO12 STEP-2:SET(H,19
,C):NEXTH
34Ø FOR V=17 TO14 STEP-2:SET(12,
V,C):NEXTV
35Ø FORH=14TO49STEP2:SET(H,14,C)
:NEXTH
36Ø SET(49,16,C)
37Ø FOR H=47 TO14STEP-2:SET(H,16
,C):NEXTH
4ØØ NEXTC
41Ø GOTO41Ø
```


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A review of synonyms, homonyms and antonyms

Differences and Similarities

By Steve Blyn
Rainbow Contributing Editor

This month's program presents a language-arts review of synonyms, homonyms and antonyms. It can be used for almost any age student, but is designed mainly for elementary and middle-graders.

Synonyms are words that have the same meaning. Homonyms are words that sound exactly the same but are spelled differently and have different meanings. Antonyms are words that have opposite meanings.

Two words are presented on the screen at one time. The student's task is to decide whether the words are:

1. synonyms
2. homonyms
3. antonyms
4. unrelated and therefore none of the other choices.

There are 40 word pairs in the DATA lines. Each line contains the two words to be evaluated, followed by a comma and then the correct number of the answer to be pressed. As long as the format remains consistent, you may have as many DATA lines as you wish to include in your version of this program.

The computer keeps track of the number of word pairs that are included in the program by the variable N used on Line 30. Be certain to change the value of this variable if you should decide to alter the number of DATA lines.

The words selected by us are, for the most part, on an upper-elementary reading level. This was really an arbitrary choice and can be exchanged for any other level that suits your needs. You may type in your own vocabulary words instead of ours when you key in the DATA statements.

An interesting idea is to use data that includes words from the child's current spelling or vocabulary word lists. New lists can be added to the existing program or saved as programs of their own. You may, for example, save many copies of this program, each with a different set of data. Only the new data needs to be keyed in when you are proceeding in this manner. Be sure to save each new version with a name different from any of the previous versions.

Lines 30-70 have the computer read all of the data at the end of the program. Lines 80-190 print a random pair of words on the screen as well as the four choices. Lines 200-240 evaluate the student's answer. If an incorrect answer is given, the correct answer is displayed on the screen.

After each question is answered, the student may either press ENTER to go on or E to end the program. When the program is concluded, a score will be given. The computer constantly keeps track of the score. Each time a new example is given, the counter on Line 80 is increased by one; this is variable X. Each time a correct answer is given, the computer increases the counter on Line 230; this is variable C. The score is computed on Line 270. The formula used is C/X*100.

We hope you and your youngsters enjoy this program. We at Computer Island are always happy to learn of your uses of the programs appearing in this column. □

Steve Blyn teaches both exceptional and gifted children, holds two master's degrees and has won awards for the design of programs to aid the handicapped. He owns Computer Island and lives in Staten Island, New York.

The listing: NYMS

```
10 REM"REVIEW OF SYNONYMS-HOMONY
MS-ANTONYMS"
20 REM"STEVE BLYN,COMPUTER ISLAN
D,STATEN ISLAND,NY,1988"
30 N=40
40 DIM A$(N),A(N)
50 P$=STRING$(32,191)
60 FOR T=1 TO N
70 READ A$(T),A(T):NEXT T
80 CLS:X=X+1
90 PRINT@2,"homonyms-antonyms-sy
nonyms";
100 PRINT@64,P$
110 R=RND(N)
120 PRINT@98,A$(R)
130 PRINT@128,P$
140 PRINT@160,"1.BOTH ARE SYNONY
MS"
150 PRINT@196,"2.BOTH ARE HOMONY
MS"
160 PRINT@232,"3.BOTH ARE ANTONY
MS"
170 PRINT@268,"4.NONE OF THE ABO
VE"
180 PRINT@288,P$
190 PRINT@321,"WHICH TYPE ARE TH
ESE WORDS? ";
200 EN$=INKEY$
```

```
21Ø IF EN$="1" OR EN$="2" OR EN$
="3" OR EN$="4" THEN 22Ø ELSE 2Ø
Ø
22Ø PRINTEN$
23Ø IF VAL(EN$)=A(R) THEN PRINT@
395,"CORRECT":C=C+1:GOTO 25Ø
24Ø PRINT@389,"SORRY, THE ANSWER
 IS";A(R)
25Ø PRINT@454,"PRESS ENTER TO GO
 ON";
26Ø AN$=INKEY$
27Ø IF AN$=CHR$(13) THEN 8Ø ELSE
 IF AN$="E" THEN 28Ø ELSE 26Ø
28Ø PRINT@452,"YOUR FINAL SCORE
IS";INT(C/X*1ØØ);"%.":END
29Ø DATA COARSE-COURSE,2
3ØØ DATA METE-MEET,2
31Ø DATA SCENT-CENT,2
32Ø DATA HAPPY-JOYOUS,1
33Ø DATA NICHE-NOOK,1
34Ø DATA NOOK-KNOCK,4
35Ø DATA PARE-PEAR,2
36Ø DATA KNIGHT-AFTERNOON,4
37Ø DATA SLIM-THIN,1
38Ø DATA SNEER-FROWN,1
39Ø DATA STEAK-STAKE,2
4ØØ DATA SITE-CITE,2
41Ø DATA REIN-REIGN,2
42Ø DATA THEIR-THOSE,4
43Ø DATA FOR-FOUR,2
44Ø DATA THEIR-THERE,2
45Ø DATA THERE-HERE,3
46Ø DATA DIRTY-SPOTLESS,3
47Ø DATA COLD-FRIGID,1
48Ø DATA FRIGID-WARM,3
49Ø DATA ICY-FRIGID,1
5ØØ DATA FRIGID-RIGID,4
51Ø DATA OPEN-SHUT,3
52Ø DATA SHUT-SHOOT,4
53Ø DATA SHOOT-CHUTE,2
54Ø DATA BEACH-BIRCH,4
55Ø DATA BEACH-BEECH,2
56Ø DATA SECURE-SAFE,1
57Ø DATA LEAVE-EXIT,1
58Ø DATA LEAVE-LIVE,4
59Ø DATA KING-SOVEREIGN,1
6ØØ DATA KING-PEASANT,3
61Ø DATA SOVEREIGN-PEASANT,3
62Ø DATA KING-RING,4
63Ø DATA ROUGH-SMOOTH,3
64Ø DATA ROUGH-SLEEK,3
65Ø DATA SLEEK-SMOOTH,1
66Ø DATA UNFAILING-CERTAIN,1
67Ø DATA AMBITIOUS-LAZY,3
68Ø DATA INDUSTRIOUS-LAZY,3
69Ø DATA AMBITIOUS-INDUSTRIOUS,1
7ØØ DATA HARMFUL-HARMLESS,3
```


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The CoCo XT hard disk interface from **Burke & Burke** lets you connect up to 2 low cost, PC compatible 5-120 Megabyte capacity hard drives to your CoCo. You buy the drive, Western Digital WD1002-WX1 or WD1002-27X (RLL) controller, and a case from the PC dealer of your choice. Just plug them into the CoCo XT, plug the CoCo XT into your Multi-PAK, and you have a 20 Meg OS9 hard disk system for **under $450!**

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Got the 35-track floppy disk blues? Burke & Burke proudly presents **HYPER-I/O Version 2.0** -- the program that modifies the RS-DOS Disk BASIC in your CoCo 1, 2, or 3 to provide a "Dynamic Disk Interface". This program lets you use your existing BASIC and RS-DOS software with hard disk interfaces (such as the CoCo XT), RAM Disks, and any mix of floppy drives from 160K to 720K each. HYPER-I/O can even read standard disks in those quad-density, 160 track floppy drives. Fully RESET protected, user-configurable, expandable, OS9 compatible, EPROM-able HYPER-I/O may soon be **THE** RS-DOS enhancement of choice for the CoCo 1, CoCo 2, and CoCo 3!

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NOVICES NICHE

THE RAINBOW is a teaching environment and we realize that the majority of our readers will always be beginners. In our continuing effort to always keep the new user in mind, and in addition to the many beginner feature articles and programs published in every issue, "Novices Niche" contains shorter BASIC program listings that entertain as well as help the new user gain expertise in all aspects of the Color Computer: graphics, music, games, utilities, education, programming, etc.

Cryptogram Contest Update

The response to April's Cryptogram Contest has been overwhelming to say the least, and we wish we *could* give everybody a copy of *The Third Rainbow Book of Adventures*! Due to the flood of entries we have already received, we cannot notify each cryptologist of the status of his or her entry, but be patient — the lucky winner and everyone else who decoded the message will receive a mention in an upcoming Novices Niche. Again, the deadline is May 1, and the drawing will be held on May 3.

Graphics

Non-Smoking Section

16K
ECB

By Ana M. Rodriguez

Keep your relationship healthy — computers don't like smoke, and neither do your lungs! The next time someone enters your computer room in a puff of smoke, banish him or her with this graphics program (point to the screen). If you have a printer and a screen dump capable of dumping a PMODE 3 graphic, you can make a printout to hang on your door.

The listing: NO SMOKE

```
1 REM **     NO SMOKING    **
2 REM **         BY        **
3 REM ** ANA M RODRIGUEZ **
1Ø PMODE3,1:PCLS:SCREEN 1,1
3Ø CIRCLE (128,96),1ØØ
4Ø CIRCLE (128,96),7Ø
5Ø LINE (185,61)-(65,121),PSET
6Ø LINE (195,75)-(75,135),PSET
7Ø LINE (85,88)-(13Ø,88),PSET
8Ø LINE (85,1ØØ)-(1Ø6,1ØØ),PSET
9Ø LINE (85,88)-(85,1ØØ),PSET
1ØØ LINE (144,1ØØ)-(178,1ØØ),PSE
T
11Ø LINE (178,1ØØ)-(178,88),PSET
12Ø LINE (17Ø,88)-(178,88),PSET
13Ø LINE (79,88)-(79,1ØØ),PSET
14Ø LINE (75,88)-(75,1ØØ),PSET
141 CIRCLE (83,78),12,,1,.3Ø,.7Ø
142 CIRCLE (75,6Ø),12,,1,.8Ø,.2Ø
143 CIRCLE (87,78),12,,1,.3Ø,.7Ø
144 CIRCLE (79,6Ø),12,,1,.8Ø,.2Ø
15Ø PAINT (128,2Ø), Ø, Ø
16Ø PAINT (185,62), Ø, Ø
17Ø PAINT (86,9Ø), 3, Ø
18Ø PAINT (176,98), 3, Ø
1ØØØ GOTO 1ØØØ
```

CoCo 3 Canvas

CoCo 3

By George and Ellen Aftamonow

Turn your CoCo 3 screen into an easel for this graphics program, and watch as CoCo paints a path into modern art. The longer the program runs, the more colorful and diverse the "canvas" becomes. The program uses only three palettes but continually puts new colors into them.

The listing: CANVAS

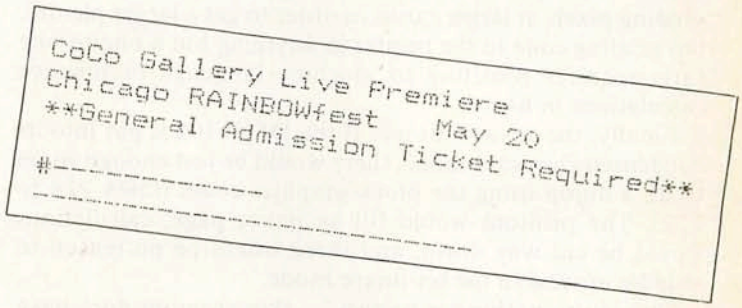
```
10 'GEORGE AFTAMONOW
20 CLSRND(8):PRINT@233,"COCO3 CA
NVAS";
30 FORT=1TO1000:NEXT
40 HSCREEN2
50 G1=RND(64)-1:PALETTE1,G1:G2=R
ND(64)-1:PALETTE2,G1:G3=RND(64)-
1:PALETTE3,G3
60 IFG1=G2 OR G1=G3 OR G2=G3 THE
N50ELSEPALETTE2,G2
70 HCOLOR1,2
80 Z=RND(10)+1
90 FORX=1TO255STEPZ+2:Y=1:X1=1:Y
1=191-(X/1.5):HLINE(X,Y)-(X1,Y1+
RND(4)),PSET:NEXTX
100 FORX=1TO320STEPZ+2:X1=320:Y1
=X/1.5:HLINE(X,Y)-(X1,Y1+RND(4))
,PSET:NEXTX
110 FORX1=255TO1STEP-Z-2:X=320:Y
=191-X1/1.5:Y1=191:HLINE(X,Y)-(X
1,Y1),PSET:NEXTX1
120 FORX1=320TO1STEP-Z-2:X=1:Y=X
1/2.33:Y1=191:HLINE(X,Y)-(X1,Y1)
,PSET:NEXTX1
130 HCOLORRND(16)-1,RND(16)-1:HC
IRCLE(160,96),R,3,RND(10)*.1
140 FORE=1TORND(9):X=RND(320):Y=
RND(191):C=RND(9)-1:C1=RND(9)-1:
HCOLORRND(9)-1,RND(9)-1:HCIRCLE(
X,Y),RND(100),C,RND(10)*.1
150 HPAINT(X,Y),C1,C:NEXTE
160 FORX=1TO320STEPZ:HLINE(0,191
)-(X,0),PSET:NEXT
170 FORX=1TO320STEPZ:HLINE(320,0
)-(X,191),PSET:NEXT
180 FOREE=1TO10:PALETTE1,RND(64)
-1:PALETTE2,RND(64)-1:PALETTE3,R
ND(64)-1:NEXT
190 GOTO90
```

Printer

Ticket Maker

4K

By Ed Schenck



Has your club ever needed raffle tickets for a fund-raiser or tickets for entrance to a club-sponsored event? If so, then *Ticket* is for you. *Ticket* is adaptable for whatever type of tickets you need. The program prints tickets continuously due to a GOTO loop, so you'll need to press BREAK to stop. Delete Line 116 if you want to print only one ticket at a time.

The listing: TICKET

```
1 CLS
5 PRINT"***********"
10 PRINT"TICKET MAKER"
20 PRINT"BY ED SCHENCK"
25 PRINT"***********"
26 PRINT"PUT A SHEET OF PAPER IN
 YOUR PRINTER AND GET READY"
30 PRINT"WHAT WOULD YOU LIKE ON
THE FIRST LINE?"
35 INPUT A$
40 PRINT"WHAT WOULD YOU LIKE ON
YOUR SECOND LINE?"
45 INPUT B$
50 PRINT"WHAT WOULD YOU LIKE ON
YOUR THIRD LINE?"
55 INPUT C$
60 PRINT"WHAT WOULD YOU LIKE ON
YOUR FOURTH LINE?"
65 INPUT D$
70 PRINT"WHAT WOULD YOU LIKE ON
YOUR FIFTH LINE?"
75 INPUT E$
76 PRINT"THIS WILL PRINT CONTINU
SLY."
77 PRINT"NOW PRINTING......."
80 PRINT#-2,A$
85 PRINT#-2,B$
90 PRINT#-2,C$
100 PRINT#-2,D$
110 PRINT#-2,E$
111 PRINT#-2,"#----------"
115 PRINT#-2,"----------
-------"
116 GOTO 80
120 PRINT"DONE!!!"
```

Graphics Reference Chart

4K

By Daniel T. Weaver

Tandy supplied me with the formula for figuring out graphics codes when I bought my CoCo, but I quickly got tired of plugging in variables and performing the mathematical functions. GRAFCODE made all those calculations unnecessary. Just run the program while your printer is online to create a handy reference chart. But watch your screen to see the graphics characters!

The listing: GRAFCODE

```
Ø PRINT#-2,TAB(6);"HANDY GRAPHIC
S CODE REFERENCE CHART":PRINT#-2
,TAB(6);"COLOR","+PATTERN","=COD
E#":'INSERT FANFOLD PAPER, TURN
 ON PRINTER, BUT WATCH SCREEN!
1 FORC=1TO8:FORP=ØTO15:D=128+16*
(C-1)+P:PRINT"CODE#"D"="CHR$(D)C
HR$(13):PRINT#-2,TAB(6);C,P,D:NE
XTP:NEXTC:PRINT#-2,TAB(6);"1=GRE
EN 2=YELLOW 3=BLUE 4=RED 5=BUFF
6=CYAN 7=MAGENTA 8=ORANGE":PRINT
#-2,TAB(6);"FOR PATTERNS CONSULT
 COCO OWNER'S MANUAL"
```

A Full-Page Dump for the DMP-105

16K ECB

By John Handis

I have written several screen dumps in BASIC, and they produced pixels at a one-to-one ratio. In other words, for every pixel on the screen, the printer would produce one dot on the page, which resulted in very small pictures. Also, the printer did not correct for the CoCo's irregularly shaped pixels — the printouts were coming out squashed. I tried sending pixels at larger ratios in order to get a larger picture, but sending code to the printer in anything but a one-to-one ratio requires resorting to machine language or massive calculations in BASIC.

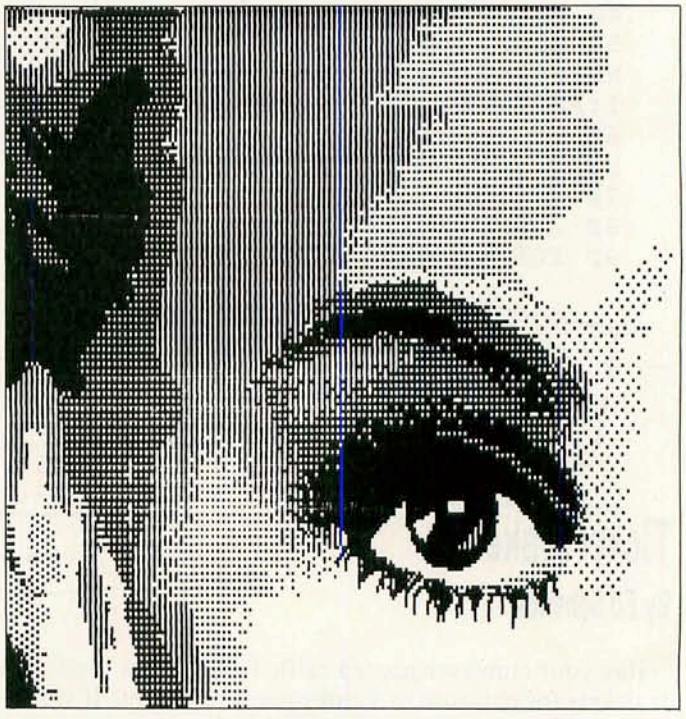
Finally, the answer hit me. If the DMP-105 is put into its condensed character mode, there would be just enough room to do a dump using the block graphics codes (CHR$ 224 to 239). The printout would fill an entire page, calculations would be cut way down, and there would be no reason to muddle around in the bit-image mode.

Obviously, nothing is perfect — this program does have its drawbacks. First, the dump is still pretty slow, taking about 15 to 20 minutes to do a PMODE 4 screen. The dump should work in any two-color PMODE as long as you change the PMODE value in Line 20, but it will not work in four-color modes. Also, the condensed blocks overcompensate for CoCo's irregularly shaped PMODE 4 pixels — now, instead of being squashed horizontally, they are squashed vertically! And another thing. According to the DMP-105 manual, graphics printing puts a strain on the print head. It suggests stopping every 1/6 page and giving the print head at least one minute's rest to keep it from overheating. If you are worried about overheating the print head, add this line, which will pause the printer for one minute every 1/6 page:

```
55 IF Y/22=INT(Y/22) AND Y>0 THEN FOR K=0 TO
3600:NEXT
```

The listing: BIGDUMP

```
 5 DIM C(15)
1Ø PRINT#-2,CHR$(27);CHR$(2Ø):'C
OMPRESSED MODE
2Ø PMODE4,1:SCREEN1,1:PRINT#-2,C
HR$(27);CHR$(28):'1/2 LINEFEED
3Ø FORC=ØTO15:READ C(C):NEXT
4Ø DATA 224,225,226,231,227,233,
23Ø,235,228,229,234,236,232,237,
238,239
45 PRINT#-2,CHR$(224);CHR$(224);
5Ø FORY=ØTO191STEP2:FORX=ØTO255S
TEP2
6Ø C=Ø
7Ø IF PPOINT(X,Y)=Ø THEN C=C+1
8Ø IF PPOINT(X+1,Y)=Ø THEN C=C+2
9Ø IF PPOINT(X,Y+1)=Ø THEN C=C+4
1ØØ IF PPOINT(X+1,Y+1)=Ø THEN C=
C+8
11Ø PRINT#-2,CHR$(C(C));:NEXT:PR
INT#-2,CHR$(13);CHR$(224);CHR$(2
24);
12Ø NEXT
13Ø PRINT#-2,CHR$(27);CHR$(19):'
```



```
STANDARD CHARACTER SET
14Ø PRINT#-2,CHR$(27);CHR$(54):'
FULL LINEFEED
15Ø END
16Ø 'COPYRIGHT (C) 12/29/1985 BY
 JOHN W. HANDIS
```

Utilities

Color in 32 Columns

CoCo 3

By Chuck Katsekes

Having luxuriated in 80 columns and all the possible combinations of color, do you CoCo 3 owners find yourselves nostalgically reminiscing about the good ol' days of 32-column CoCoing (when the eye strain was not as great)? Do you like being able to sit back — way back — and relax and still be able to read your screen without squinting? So what's keeping you squinting at 80 columns? Color — black on green just does not excite you.

Pal 32 is here to save your eyes. You can have your eye-soothing text and bask in the CoCo 3's palette of colors, too. Just run the program and answer the prompts for the desired foreground and background colors, and your eyes will thank you.

The listing: PAL32

```
1Ø '32 COLUMN PALETTE UTILITY
2Ø '(C) COPYRIGHT 1987
3Ø ' BY CHUCK KATSEKES
4Ø CLS
5Ø PRINT@Ø,STRING$(33,175)
6Ø PRINT@33,"32 COL. SCREEN PALE
TTE UTILITY":PRINT@63,STRING$(1,
175)
7Ø PRINT@64,STRING$(32,175)
8Ø PRINT@98,"X=BACKGROUND  Y=FOR
EGROUND"
9Ø PRINT@132,"<Ø-63>":PRINT@146,
"<Ø-63>"
1ØØ FOR X=Ø TO 63
11Ø FOR Y=Ø TO 63
12Ø PRINT:PRINT"X =";:INPUT X
13Ø PRINT:PRINT"Y =";:INPUT Y
14Ø CLS:POKE&HFFBD,X:POKE&HFFBC,
Y
15Ø END
```

Phrase Centerer

16K ECB

By Gip Wayne Plaster, II

One of the biggest pains for new programmers is trying to program aesthetic text screens. Centering text requires constant reference to the PRINT@ chart in the manual, and also a lot of trial and error. This short program eliminates frantic flipping of pages. Just run the program, type in your phrase and on what line of the screen you would like it to appear (there are 16 lines), and it gives you the proper PRINT@ location. This way you can design your text screen before you program it.

The listing: CENTERER

```
1Ø '**************************
2Ø '**PHRASE CENTERER**********
3Ø '**A  COCO  QUICKY**********
4Ø '**BY GIP WAYNE PLASTER*****
5Ø '**************************
6Ø CLS
7Ø LINE INPUT"STRING:";S$
8Ø L=LEN(S$)
9Ø IFL>32THENPRINT"TOO LONG":GOT
O7Ø
1ØØ PRINT"THIS PHRASE HAS"L"CHAR
ACTERS."
11Ø PRINT"ON WHAT LINE DO YOU WI
SH TO     PRINT?"
12Ø INPUT"ENTER 1-16:";R
13Ø IFR>16 OR R<1THEN12Ø:' WILL
NOT ALLOW MORE THAN 16 OR LESS T
HAN 1
14Ø R=R-1:' CONVERT LINE TO COMP
UTER'S NUMBERING SYSTEM
15Ø LN=R*32:' CONVERTS FOR 32 CO
LUMN SCREEN
16Ø X=(32-L)/2:' FIND NUMBER OF
SPACES BEFORE PHRASE
17Ø CC=LN+X:' ADDS SPACES AND LI
NE
18Ø LC=INT(CC):' MAKES SURE NUMB
ER IS INTEGER
19Ø PRINT"THE PRINT @ LOCATION I
S";LC
2ØØ PRINT"DO YOU WANT TO TRY AGA
IN?"
21Ø A$=INKEY$:IFA$=""THEN21Ø
22Ø IFA$="Y"THEN7Ø
```

Game

Blockout Wipeout

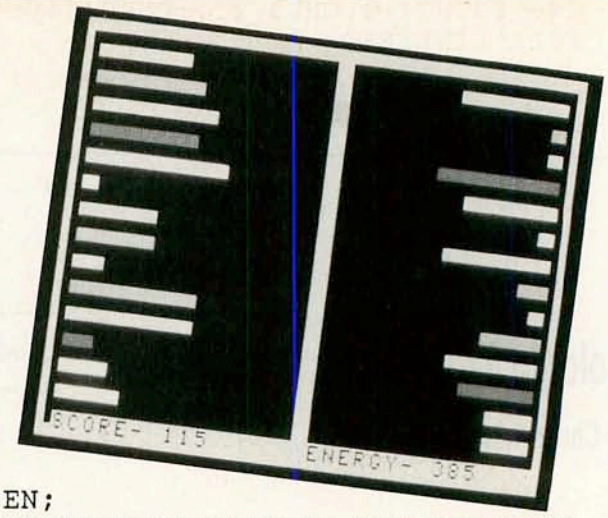
By Tony Owens

Blockout is a short program full of fast and colorful action. The object is to keep the ever-growing blocks from reaching the center rail. To do this, use your right joystick to move your cannon up and down; press the firebutton and move left or right to fire. It is best to go for the longer blocks; if they reach your rail, they will deplete your energy.

The game has two levels and could be modified for more. The high-speed poke was left out but could be added. It's lightning fast with the high-speed poke on the CoCo 3!

The listing: BLOCKOUT

```
10 '-BLOCKOUT-'
20 'BY TONY OWENS'
30 'MONMOUTH,OREGON'
40 DIMA(16):DIMB(16):DIMC(16):DI
MD(16):DIME(16):DIMY(16):V=8:LV=
0:PLAY"T255L255"
50 CLS0:EG=EG+1:IF EG>2 THEN GOT
O360
60 FORY=1TO14:A(Y)=0:B(Y)=0:E(Y)
=0:NEXTY
70 FORX=1TO14:C(X)=0:D(X)=0:E(X)
=0:NEXTX
80 T=0:X=0:Y=0:EN=500:C=0:A=0
90 GOSUB160
100 A=0:FORT=1TO15:PRINT@31+A,CH
R$(165);CHR$(170);:A=A+32:NEXTT
110 PRINT@1,STRING$(30,172);:POK
E1024,174:POKE1024+31,173
120 PRINT@481,STRING$(30,32);:PO
KE1535,175:POKE1504,171
130 FORX=1040TO1488STEP32:POKEX,
175:NEXTX
140 PRINT@481,"SCORE- 0";:PRINT@
497,"ENERGY- 500";:POKE1520,175
150 GOTO 210
160 FORY=0TO14:A(Y)=1040+A:A=A+3
2:NEXTY:A=0
170 FORY=1TO15:Y(Y)=Y(Y)+A:A=A+4
.5:NEXTY:A=0
180 C=140-(6*LV):FORX=1TO8:E(X)=
C:E(X+8)=C:C=C+16:NEXTX
190 FORX=0TO14:C(X)=1040+A:A=A+3
2:NEXTX:A=0
200 RETURN
210 Y=RND(14):X=RND(14)
220 PRINT@A(Y)+B(Y)-1039,CHR$(E(
Y));:B(Y)=B(Y)+LV+.5
230 IF B(Y)>14 THEN EN=EN-10:B(Y
)=13:PLAY"O1ABCDCBA"
240 PRINT@C(X)+D(X)-1010,CHR$(E(
X));:D(X)=D(X)-LV-.5
250 IF D(X)<-13 THEN EN=EN-10:D(
X)=-13:PLAY"O1ABCDCBA":PRINT@504
```




```
,EN;
260 IF EN<0 THEN LV=LV+.5:GOTO35
0
270 J=JOYSTK(0):IF PEEK(345)=254
 THEN 320
280 J2=JOYSTK(1):IF J2<20 THEN V
=V-1:IF V<1 THEN V=1
290 IF J2>40 THEN V=V+1:IF V>14
THEN V=14
300 POKEA(V),255:POKEA(V)-32,175
:POKEA(V)+32,175
310 IF PEEK(345)=255 THEN 210
320 IF J<33 THEN FORS=A(V)+13 TO
 A(V)+B(V)+1 STEP-2:PRINT@S-1040
,CHR$(125);CHR$(128);CHR$(128);:
NEXT:PLAY"O4ADG":B(V)=B(V)-2:PRI
NT@S-1038,CHR$(128);:IF B(V)<0 T
HEN B(V)=0
330 IFJ>33THENFORS=A(V)+17 TO A(
V)+28+D(V)STEP2:PRINT@S-1040,CHR
$(128);CHR$(128);CHR$(123);:NEXT
:PLAY"O2GDA":D(V)=D(V)+2:PRINT@S
-1040,CHR$(128);:IFD(V)>0THEN D(
V)=0
340 EN=EN-1:SC=SC+1:PRINT@487,SC
;:PRINT@504,EN;:GOTO210
350 IFEG=2THEN360 ELSE FORX=1TO3
0STEP2:PLAY"V+ABC":NEXTX:CLS0:PR
INT@106,"next";CHR$(128);"level"
;:FORX=1TO1000:NEXTX:GOTO50
360 CLS0:PRINT@105,"to";CHR$(128
);"play";CHR$(128);"again";:PRIN
T@137,"press";CHR$(128);"any";CH
R$(128);"key";
370 FORX=1TO5000:IF INKEY$=""THE
N NEXTELSERUN
```

Submissions to "Novices Niche" are welcome from everyone. We like to run a variety of short programs that can be typed in at one sitting and are useful, educational and fun. Keep in mind, although the short programs are limited in scope, many novice programmers find it enjoyable and quite educational to improve the software written by others.

Program submissions must be on tape or disk. We're sorry, but we cannot key in program listings. All programs should be supported by some editorial commentary, explaining how the program works. If your submission is accepted for publication, the payment rate will be established and agreed upon prior to publication.

Make eye-catching newsletters with this two-column formatter

Printing In Two Columns

By Charles E. Brown, Jr.

Steve Lai's listing program (May 1985, Page 42) is designed to let you print a program listing in two columns on each page, saving paper and allowing easy comparison of screen to printout. The program works well and fills a need as is, but given minor modifications, it could well serve many other purposes.

Let's look at one example. With very few changes, the program could become valuable for the creation of newsletters by small businesses and clubs. Additionally, they could modify their customary correspondence format, offering polish and pizazz.

I have redesigned Lai's program in order to give my correspondents letters unlike any they have received from other writers. Writing letters in such a new style is much like wearing a new and different suit, knowing that you'll attract attention on every street corner. You are doing something different and unique, expressing your individuality and personality.

Chuck Brown, who began computing in 1976, is a self-taught programmer interested in artificial intelligence for the Color Computer. He and his wife, Barbara, live in White Stone, Virginia, and own West Bay Company.

My modified program is called LETTERS. It provides enough header space at the top of Page 1 for you to design and insert your own logo or letterhead. Accompanying LETTERS is PERSLOGO, which prints a logo at the top of Page 1. Your examination of PERSLOGO will show how easily the desired text can be printed. A little study of the five data lines for block graphics may be needed to design your own graphics logo. Experiment and enjoy.

LETTERS will accept any ASCII file prepared by your word processor. But you must set your right margin so that you type no more than 36 characters per line (approximately half a page), and you must put a carriage return at the end of each line. Leave no blank lines at the top of the first page, and prepare your ASCII text without header space or embedded word processor printer codes of any kind other than the carriage returns. LETTERS will do all formatting and margin control for you.

There are variations among printers and word processing programs. For yours, some experimenting may be necessary. I use an Epson MX-8Ø printer with VIP Writer. In VIP Writer, I find that the first character is always lost. So I must insert one blank space at the very beginning of my text.

I have left printer codes out of my program, allowing you to insert your printer's codes at the beginning of LETTERS. If you want your columns to be right justified, you must refer to your printer and word processing manuals.

Up and Running

Use your own modification of the PERSLOGO program, changing the Epson printer codes to match your printer. When the program is run, it will end by showing an OD Error. Reposition your first page to the top of the page (perforation).

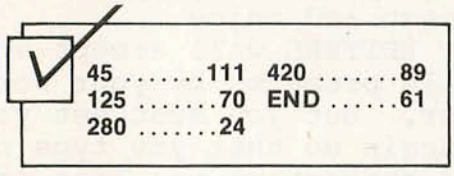
Now load and run LETTER, which will help you input your ASCII text file and will give you the desired two-column output, with each page numbered in sequence. Merely follow the simple instructions on your screen.

Enjoy your letter writing. You will make an impact by giving your correspondence a neat and different appearance that will get your reader's attention. □

Editor's Note: The Personal Logo *program is intended for use with an Epson MX-80 printer. Because the data used is that of the author, it will require alteration. The special control codes used are as follows:*

CHR$(14)	*turn on double width till next carriage return*
CHR$(27)CHR$(69)	*turn on emphasized mode*
CHR$(27)CHR$(70)	*turn off emphasized mode*
CHR$(27)CHR$(71)	*turn on double-strike mode*
CHR$(27)CHR$(72)	*turn off double-strike mode*

In addition, the data lines 90 through 120 represent graphics characters which will need to be changed for your own logo. Subtract 32 from each value used since 32 is added by the program in Line 20. You may have to enter the graphics mode to achieve graphics characters on your printer.



Listing 1: LETTER

```
5 'PROGRAM: LETTERS/TWO, GIVES
   TWO COLUMN PRINTING, WITH
   HEADER SPACE
1Ø CLEAR15ØØØ
11 CO=8Ø  'PAGE WIDTH FOR TOTAL
TEXT
12 NL=45  'LINES PER FIRST PAGE
          (LINE COUNTER)
13 TM=1Ø  'WIDTH OF TOP MARGIN
          (VARY FOR LETTERHEAD)
14 SP=Ø   'SINGLE PAGE FLAG
          (CONTINUOUS/SINGLE PG)
15 LE=Ø   'LENGTH OF DATA ENTRY
16 'CN    = COUNTER FOR CHARACTER
S  (RD$=INPUT CHARACTER READ)
17 'LF    = LINEFEED
18 'PL$   = PRINT LINE STRING
19 'ST    = FLAG FOR FINISH OF WO
RK
2Ø DIMPL$(116):AL=Ø:CN=1:Z$=CHR$
(128):PG=Ø  '(PG=PAGE COUNTER)
21 BL$=STRING$(32,32)  '1 LINE O
F BLANKS ON SCREEN
22 IN=INT((CO/8Ø)/2)  'DETERMINE
S PAGE CENTERLINE
25 '----------MAIN MENU
3Ø CLS:PRINT"   TWO COLUMN PROGR
AM LISTER":PRINTSTRING$(32,131);
4Ø PRINTZ$"note"Z$" THE FILE TO
BE USED        MUST BE IN 'ASCII
' FORMAT."
45 PRINT:PRINTZ$"filename"Z$" ";
5Ø LINEINPUTDN$:IFLEFT$(RIGHT$(D
N$,4),1)<>"/"THEN DN$=DN$+"/BAS"
6Ø IF LEN(DN$)>12 OR LEN(DN$)<5
THEN3Ø
65 PRINT:PRINTZ$"source"Z$"drive
"Z$" ";:INPUTDD:DRIVEDD
7Ø PRINT:PRINTZ$"city"Z$"and"Z$"
date"Z$" "  'INPUT, NEXT LINE, M
AY BE UP TO 79 CHARACTERS, CENTE
RED ON PAGE
8Ø LINEINPUT   " ";NM$:LE=LEN(NM
$):IFLE>CO THEN7Ø
9Ø PRINT:PN=INT((CO-LE)/2)
1ØØ PRINTZ$"stop"Z$"for"Z$"each"
Z$"page"Z$" Y/N "
11Ø I$=INKEY$:IFLEFT$(I$,1)="Y"
ORLEFT$(I$,1)="y" THENSP=1 ELSEI
FLEFT$(I$,1)<>"N" ANDLEFT$(I$,1)
<>"n" THEN11Ø ELSESP=Ø
119 '----------LOAD THE DATAFILE
 TO BE PRINTED
12Ø CLS:PRINT"    LOAD THE FILE
FROM DISK":PRINTSTRING$(32,131);
125 PRINT:PRINTZ$"insert"Z$"data
"Z$"disk"Z$"in"Z$"drive"Z$;DD
128 PRINT:PRINT:PRINTZ$"press"Z$
"enter"Z$"to"Z$"continue"Z$;:INP
UTAN$
13Ø OPEN"D",#1,DN$,1
14Ø FIELD#1,1 AS RD$
15Ø LF=LOF(1)
```

```
16Ø '----------SET UP NEW PAGE F
OR PRINTING
19Ø CLS:PRINT"       PREPARE FOR
NEW PAGE":PRINTSTRING$(32,131);:
PG=PG+1
2ØØ PRINT:       PRINT" PLEASE WA
IT.":PRINT:PRINT" PRINT LINES AR
E BEING COUNTED.":PRINT:PRINT" P
RINTING WILL START BEFORE THIS N
UMBER SHOWS"NL*2+1
2Ø5 PRINT@331,CHR$(129);STRING$(
5,131);CHR$(13Ø):PRINT@363,CHR$(
133);:PRINT@369,CHR$(138):PRINT@
395,CHR$(132);STRING$(5,14Ø);CHR
$(136)
21Ø FOR F=1 TO NL*2:PL$(F)=BL$:N
EXT F
22Ø FORF1=1TONL*2:PL$(F1)=STRING
$(37,32)  '37 SHOWS COLUMN WIDTH
 (INCLUDES CR)
23Ø FORF2=1TO37:CN=CN+1:IFCN>LF
THENST=1:GOTO3ØØ  '37 SHOWS COLU
MN WIDTH (INCLUDES CR)
24Ø GET#1,CN
25Ø IFRD$=CHR$(13) THEN28Ø
26Ø MID$(PL$(F1),F2,1)=RD$
27Ø NEXTF2
28Ø PRINT@364,F1;:NEXTF1
3ØØ IFSP=1 THENGOSUB4ØØ ELSEIFAL
=Ø THENGOSUB4ØØ ELSEPRINT#-2:PRI
NT#-2
31Ø PRINT@48Ø,       Z$"now"Z$"p
rinting"Z$:FORF=1 TONL:PRINT#-2,
TAB(IN);PL$(F);  "    ";PL$(F+NL
)
32Ø NEXT
325 PRINT#-2:PRINT#-2,TAB(36)"Pa
ge"PG
33Ø IFST=1THENPRINT#-2,CHR$(12):
GOTO45Ø
34Ø PRINT#-2,CHR$(12):NL=56:GOTO
19Ø  '56 SHOWS NUMBER OF LINES,
PAGE 2 AND AFTER
39Ø '----------READY A NEW PAGE
FOR PRINTING
4ØØ AL=1:CLS:PRINT"       INSERT
 NEW PAGE":PRINTSTRING$(32,131);
:PRINTZ$"position"Z$"new"Z$"page
"Z$"in"Z$"printer"Z$
4Ø5 PRINT:PRINT:PRINTZ$"press"Z$
"enter"Z$"to"Z$"continue"Z$" ";:
LINEINPUTI$
41Ø PRINT#-2,STRING$(TM,13):PRIN
T#-2,TAB(PN);NM$:PRINT#-2:RETURN
42Ø '----------JOB IS FINISHED
45Ø CLOSE:CLS:PRINT"       PRINTI
NG IS FINISHED":PRINTSTRING$(32,
131);:PRINT" THE TWO COLUMN PRIN
TING IS      FINISHED."
455 PRINT:PRINT:PRINT" PRESS 'Y'
 FOR ANOTHER PRINTING  OR PRESS
```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```
'N' TO STOP.":PG=Ø
46Ø I$=INKEY$:IFLEFT$(I$,1)="Y"
ORLEFT$(I$,1)="y" THENRUN ELSEIF
LEFT$(I$,1)="N" ORLEFT$(I$,1)="n
" THENEND ELSE46Ø
55Ø 'FIRST SPACE ALWAYS LOST. SO
     INDENT ONE SPACE TO START.
56Ø 'USE NO PRINT CODES IN TEXT.
     CARRIAGE RETURN AFTER LINE.
57Ø 'DO NOT PLACE HEADER SPACES
     IN FILE COPY. PROGRAM = 3,
     OR 1Ø IF USING LETTERHEAD.
58Ø 'IF DATE IS TO BE PRINTED BY
     PROGRAM, TOP CENTER, DO NOT
     PLACE DATE IN DATA COPY.
59Ø 'USE VIP/WRITER LINELENGTH
     OF 37, NON JUSTIFIED.
199Ø 'NOTE THAT YOU MUST COUNT
      ANY 37-CHARACTER LINE AS
      INCLUDING THE CARRIAGE
      RETURN (36 CHARACTERS +CR)
2ØØØ 'LETTERS/TWO,  87Ø424. WAS
ORIGINALLY '2-COLUMN/BAS' IN THE
MAY 1985 RAINBOW, PAGE 44, BY
STEPHEN LAI. PROGRAM MODIFIED BY
C E BROWN FOR NEWSLETTERS AND
CORRESPONDENCE USE.
```

Listing 2: PERSLOGO

```
5 PRINT#-2:PRINT#-2:PRINT#-2
1Ø PRINT#-2,CHR$(27)CHR$(69)CHR$
(27)CHR$(71)
2Ø READA:IFA>1ØØ THENPRINT#-2,TA
B(8)CHR$(A+32);:GOTO2Ø
3Ø IFA>Ø THENPRINT#-2,STRING$(A,
B+32);:GOTO 2Ø
4Ø IFA=Ø THEN PRINT#-2:GOTO2Ø
5Ø ONABS(A) GOSUB6Ø,7Ø,8Ø:GOTO2Ø
6Ø PRINT#-2,TAB(28)CHR$(14)"CHAR
LES E. BROWN JR":RETURN
7Ø PRINT#-2,TAB(39)          "ROUT
E 1, BOX 59Ø":RETURN
8Ø PRINT#-2,TAB(31)          "WHIT
E STONE, VIRGINIA 22578-9765":RE
TURN
9Ø DATA 151,131,131,131,131,131,
131,131,131,131,131,171,Ø
95 DATA 149,128,17Ø,151,139,133,
17Ø,151,171,149,128,17Ø,-1
1ØØ DATA 149,128,17Ø,149,16Ø,144
,17Ø,151,171,148,128,17Ø,-2
11Ø DATA 149,128,138,141,142,133
,138,    141,142,133,128,17Ø,-3
12Ø DATA 141,14Ø,14Ø,14Ø,14Ø,14Ø
,14Ø,14Ø,14Ø,14Ø,14Ø,142,Ø
1ØØØ PRINT#-2,CHR$(27)CHR$(7Ø)CH
R$(27)CHR$(72)
2ØØØ 'PERSLOGO/BAS, 87Ø429. WILL
      PRINT PERSONAL LETTERHEAD
      AND GRAPHICS
```

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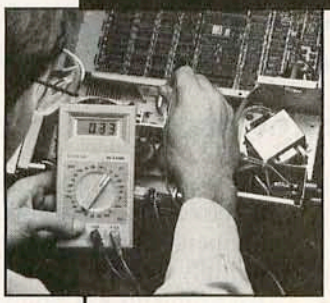

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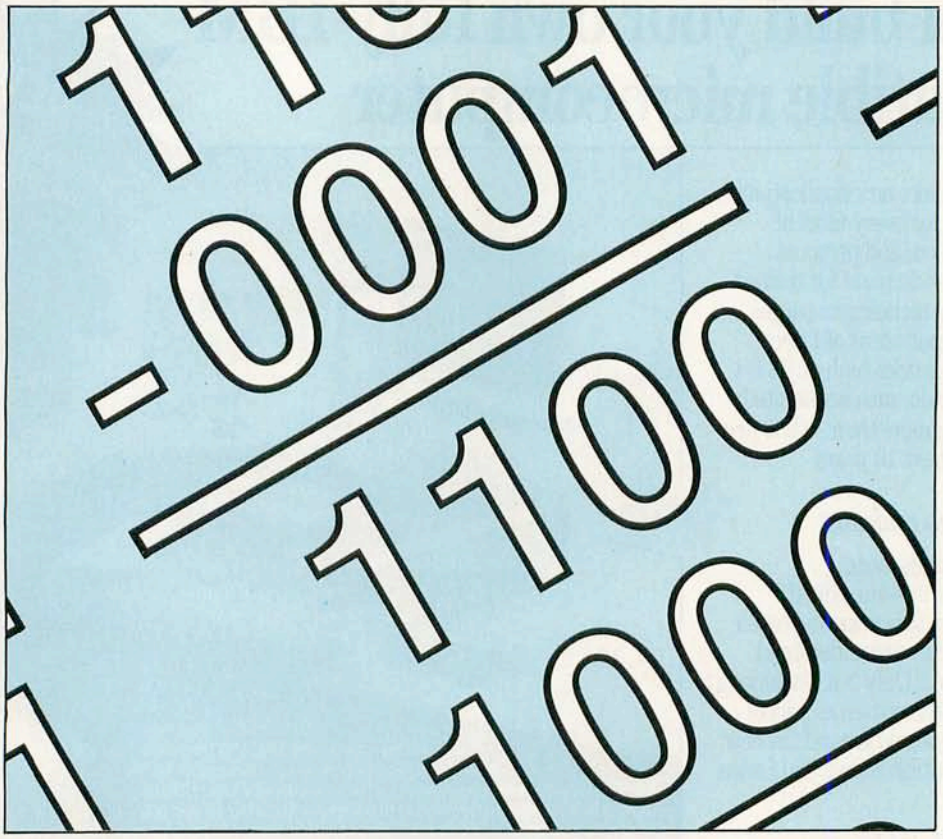


The Ins and Outs of Boolean

By Eric Levinson

This program was designed to test students in Boolean addition, multiplication and subtraction. There are 20 questions and you must answer the question correctly by pressing either a 0 or 1. The 0 stands for a binary "off" state while the 1 stands for a binary "on" state. The right arrow allows you to make corrections by completely erasing your answer.

When the program is run, the computer asks for your name. This allows a whole classroom to use and store each student's results on disk or cassette. Student records may then be called up by typing PRINT SCORES at the first prompt.

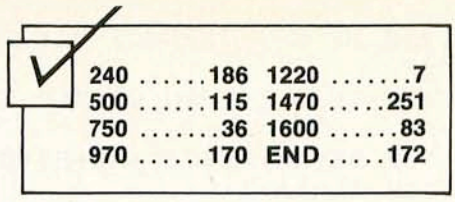
The first five problems ask you to add two 4-digit binary numbers, and the next five ask you to subtract two 4-digit numbers. The following five ask you to multiply two 4-bit numbers, and the last five problems ask you to add two 8-bit numbers. Notice that the last five problems are timed, but the results of the timing are not recorded on disk.

Cassette operation may be used by changing the following lines:

```
1560 OPEN"O",#-1,LEFT$ (N$,8)
1570 PRINT#-1,R,R1,R2,R3,W,
 W1,W2,W3,N$
1580 CLOSE #-1
1670 OPEN"I",#-1,N$
1680 INPUT#-1,R,R1,R2,R3,W,
 W1,W2,W3,N$
1690 CLOSE #-1
```

Eric Levinson is studying to be an electronics engineer. Previously, he was a service technician for Apple, IBM, Zenith and Compaq.

(Questions or comments may be addressed to the author at 151 Hearthstone, Irvine, CA 92714. Please enclose an SASE when requesting a reply.) □



The listing: BOOLEAN

```
1Ø '     PROGRAM DEVELOPED AND W
RITTEN BY
2Ø '     ERIC LEVINSON
3Ø '     1Ø39 NEVADA STREET
4Ø '     GLENWOOD, IL 6Ø425
5Ø '     (312) 799-6747
6Ø '     COPYRIGHT (C) 1987
7Ø CLEAR 5ØØØ
8Ø DIM B$(255)
9Ø CLS
1ØØ PRINT"BINARY ARITHMETIC"
11Ø PRINT"BY ERIC LEVINSON"
12Ø PRINT"WHAT IS YOUR NAME";
13Ø INPUT N$
14Ø IF N$="PRINT SCORES" THEN 16
3Ø
15Ø PRINT"STANDBY"
16Ø AA=Ø
17Ø FOR A=Ø TO 1
18Ø FOR B=Ø TO 1
19Ø FOR C=Ø TO 1
2ØØ FOR D=Ø TO 1
21Ø IF A=1 THEN A$="1"ELSE A$="Ø
"
22Ø IF B=1 THEN B$="1"ELSE B$="Ø
"
23Ø IF C=1 THEN C$="1"ELSE C$="Ø
"
24Ø IF D=1 THEN D$="1"ELSE D$="Ø
"
25Ø B$(AA)=A$+B$+C$+D$
26Ø AA=AA+1
27Ø NEXT D,C,B,A
28Ø FOR A=1 TO 5
29Ø CLS
3ØØ A1=RND(16)-1:A2=RND(16)-1
31Ø IF A1+A2>15 THEN 3ØØ
32Ø PRINT@Ø,"PROBLEM #"A
33Ø PRINT@172,B$(A1)
34Ø PRINT@2Ø3,"+"B$(A2)
35Ø PRINT@235,"-----"
36Ø B$=""
37Ø GOSUB 116Ø
38Ø ANS$=B$(A1+A2)
39Ø FOR B=Ø TO 15
4ØØ IF B$=B$(B) THEN 41Ø ELSE NE
XT B
41Ø IF B=A1+A2 THEN PRINT@267,"R
```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[Modem & Cable]

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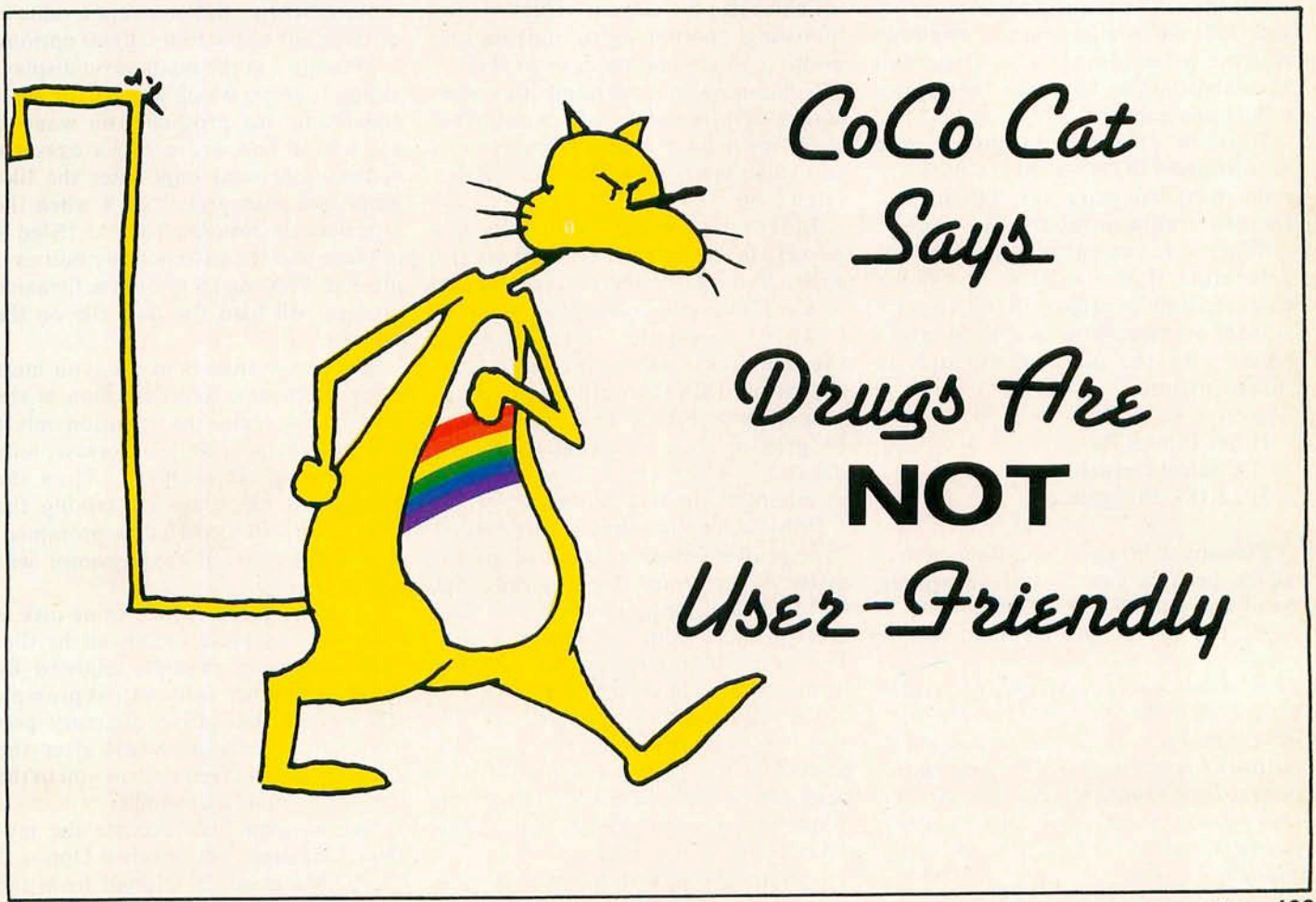
```
IGHT":R=R+1
42Ø IF B<>A1+A2 THEN PRINT@267,"_
WRONG":W=W+1
43Ø FOR AA=Ø TO 1ØØØ:NEXT AA
44Ø NEXT A
45Ø FOR A=6 TO 1Ø
46Ø CLS
47Ø A1=RND(16)-1:A2=RND(16)-1
48Ø IF A1-A2<Ø THEN 47Ø
49Ø PRINT@Ø,"PROBLEM #"A
5ØØ PRINT@172,B$(A1)
51Ø PRINT@2Ø3,"-"B$(A2)
52Ø PRINT@235,"-----"
53Ø B$=""
54Ø GOSUB 116Ø
55Ø ANS$=B$(A1-A2)
56Ø FOR B=Ø TO 15
57Ø IF B$=B$(B) THEN 58Ø ELSE NE
XT B
58Ø IF B=A1-A2 THEN PRINT@267,"R
IGHT":R1=R1+1
59Ø IF B<>A1-A2 THEN PRINT@267,"
WRONG":W1=W1+1
6ØØ FOR AA=Ø TO 1ØØØ:NEXT AA
61Ø NEXT A
62Ø FOR A=11 TO 15
63Ø CLS
64Ø A1=RND(16)-1:A2=RND(16)-1
65Ø IF A1*A2>15 THEN 64Ø
66Ø IF A1=Ø OR A2=Ø THEN 64Ø
67Ø PRINT@Ø,"PROBLEM #"A
68Ø PRINT@172,B$(A1)
69Ø PRINT@2Ø3,"*"B$(A2)
7ØØ PRINT@235,"-----"
71Ø B$=""
72Ø GOSUB 116Ø
73Ø ANS$=B$(A1*A2)
74Ø FOR B=Ø TO 15
75Ø IF B$=B$(B) THEN 76Ø ELSE NE
XT B
76Ø IF B=A1*A2 THEN PRINT@267,"R
IGHT":R2=R2+1
77Ø IF B<>A1*A2 THEN PRINT@267,"
WRONG":W2=W2+1
78Ø FOR AA=Ø TO 1ØØØ:NEXT AA
79Ø NEXT A
8ØØ PRINT:PRINT"THE NEXT TEST WI
LL BE TIMED."
81Ø PRINT"STANDBY FOR 8 BIT NUMB
ERS."
82Ø AA=16
83Ø FOR E=1 TO 15
84Ø FOR A=Ø TO 1
85Ø FOR B=Ø TO 1
86Ø FOR C=Ø TO 1
87Ø FOR D=Ø TO 1
88Ø IF A=1 THEN A$="1" ELSE A$="
Ø"
89Ø IF B=1 THEN B$="1" ELSE B$="
Ø"
9ØØ IF C=1 THEN C$="1" ELSE C$="
Ø"
91Ø IF D=1 THEN D$="1" ELSE D$="
Ø"
92Ø B$(AA)=B$(E)+A$+B$+C$+D$
93Ø AA=AA+1
94Ø NEXT D,C,B,A,E
95Ø FOR A=Ø TO 15:B$(A)="ØØØØ"+B
$(A):NEXT A
96Ø FOR A=16 TO 2Ø
97Ø CLS:TT=Ø
98Ø A1=RND(256)-1:A2=RND(256)-1
99Ø IF A1+A2>255 THEN 98Ø
1ØØØ PRINT@Ø,"PROBLEM #"A
1Ø1Ø PRINT@17Ø,B$(A1)
1Ø2Ø PRINT@2Ø1,"+"B$(A2)
1Ø3Ø PRINT@233,"---------"
1Ø4Ø B$=""
1Ø5Ø TIMER=Ø
1Ø6Ø GOSUB 128Ø
1Ø7Ø ANS$=B$(A1+A2)
1Ø8Ø FOR B=Ø TO 255
1Ø9Ø IF B$=B$(B) THEN 11ØØ ELSE
NEXT B
11ØØ IF B=A1+A2 THEN PRINT@265,"
RIGHT":R3=R3+1
111Ø IF B<>A1+A2 THEN PRINT@265,
"WRONG":W3=W3+1
112Ø PRINT"TIME:"TT"SECONDS."
113Ø FOR AA=Ø TO 1ØØØ:NEXT AA
114Ø NEXT A
115Ø GOTO 141Ø
116Ø FOR AT=271 TO 268 STEP -1
117Ø A$=INKEY$
118Ø IF A$=CHR$(9) THEN 171Ø
119Ø PRINT@AT,CHR$(128);
12ØØ FOR T=Ø TO 1Ø:NEXT T
121Ø PRINT@AT,CHR$(2Ø7);
122Ø FOR T=Ø TO 1Ø:NEXT T
123Ø IF A$="Ø" OR A$="1" THEN 12
4Ø ELSE 117Ø
124Ø B$=A$+B$
125Ø PRINT@AT,A$;
126Ø NEXT AT
127Ø RETURN
128Ø FOR AT=273 TO 266 STEP -1
129Ø A$=INKEY$
13ØØ IF TIMER>59 THEN TIMER=Ø:TT
=TT+1
131Ø IF A$=CHR$(9) THEN GOTO 176
Ø
132Ø PRINT@AT,CHR$(128);
133Ø FOR T=Ø TO 1Ø:NEXT T
134Ø PRINT@AT,CHR$(2Ø7);
135Ø FOR T=Ø TO 1Ø:NEXT T
136Ø IF A$="Ø" OR A$="1"THEN 137
Ø ELSE 129Ø
137Ø B$=A$+B$
138Ø PRINT@AT,A$;
139Ø NEXT AT
```

```
14ØØ RETURN
141Ø CLS
142Ø IF RR=1 THEN PRINT N$
143Ø PRINT"EVALUATION"
144Ø PRINT"   PROBLEM      NUMBER
  NUMBER"
145Ø PRINT"   NUMBER       WRONG
  RIGHT"
146Ø PRINT"--------------------
-----------"
147Ø PRINT "  1 THRU 5      "W"
    "R
148Ø PRINT " 6 THRU 1Ø      "W1"
     "R1
149Ø PRINT "11 THRU 15      "W2"
     "R2
15ØØ PRINT "16 THRU 2Ø      "W3"
     "R3
151Ø PRINT:PRINT"YOU GOT"W+W1+W2
+W3"WRONG"
152Ø PRINT"OUT OF 2Ø QUESTIONS F
OR A"
153Ø P=((R+R1+R2+R3)/2Ø)*1ØØ
154Ø PRINT"PERCENTAGE OF"P"%."
155Ø IF RR=1 THEN 161Ø
156Ø OPEN"O",#1,LEFT$(N$,8)
157Ø WRITE#1,R,R1,R2,R3,W,W1,W2,
W3,N$
158Ø CLOSE #1
159Ø PRINT"THANK YOU "N$
16ØØ PRINT"PRESS ANY KEY TO BEGI
N NEW TEST"
161Ø IF INKEY$=""THEN 161Ø ELSE
162Ø
162Ø IF RR=Ø THEN 1Ø
163Ø CLS:RR=1
164Ø PRINT"NAME OR <E>XIT"
165Ø INPUT N$
166Ø IF N$="E" THEN 1Ø
167Ø OPEN"I",#1,N$
168Ø INPUT #1,R,R1,R2,R3,W,W1,W2
,W3,N$
169Ø CLOSE #1
17ØØ GOTO 141Ø
171Ø FOR TA=268 TO 271
172Ø PRINT @TA," ";
173Ø NEXT TA
174Ø B$=""
175Ø GOTO 116Ø
176Ø FOR TA=266 TO 273
177Ø PRINT@TA," ";
178Ø NEXT TA
179Ø B$=""
18ØØ GOTO 128Ø
```



The LLISTing Formatter

By Clay Howe

Most LLIST formatting utilities require that the BASIC program to be LLISTed first be saved as an ASCII file, then read from disk or cassette and output to a printer in the required line lengths. *BestList* uses a machine language routine to handle the LLISTing and is controlled by the user through a BASIC program.

BestList's machine language code is contained in DATA lines, which are read in by the program. The user is therefore able to modify the code.

When you run the program, it will determine if the system is disk or cassette and configure itself for the system in use. You are then presented with the main menu and its three options:

1) Set Printer Baud
2) Change Defaults
3) LLIST Program

Pressing 1 brings up another menu, which permits you to set the printer baud rate to 600, 1200, 2400, 4800 or 9600. The default printer baud rate is 9600, so this option may be bypassed if you want to use that rate. After a selection is made, the program returns to the main menu.

Pressing 2 displays the default menu, which shows the current values for the following: column width, indentation, printout length and the lines to skip.

Column width is the number of characters per line that you want your LLISTing to have. It may be changed to any value from 1 to 255. The default value is 80.

Indentation comes into play if a program line is longer than the width you have selected. The second row of the program line will be LLISTed below the first portion of the line, but it will be indented from the left margin the number of spaces you have selected. This value must be greater than or equal to 1. The default is 4, which LLISTs only line numbers at the left margin.

Printout length is the number of lines to be printed before a "skip over perforation" is performed. The program is set up to a page length of 66 lines, because most printers print six lines per inch. The printout length may be anything from 1 to 65. The default is 60.

The "Skip Lines" option sets the number of blank lines that will be printed as the program skips over the perforation. It will always equal 66 minus the printout length value. The default is 6.

A note about printout length and skipping lines: Entering a value into either of these options automatically reconfigures the other so that the sum of the two always equals 66. If one is changed, the other will take care of itself. *BestList* will not accept a value of zero for any of the four default options.

Pressing 3 at the main menu displays another screen, which will ask for input concerning the program you want to LLIST. If you are using a cassette system, you need only enter the filename and then press ENTER when the tape with the program to be LLISTed is in place and the cassette Play button is pressed. Pressing ENTER at the filename prompt will load the next file on the cassette.

If a disk system is in use, you must enter a filename and extension at the first prompt (enter the extension only if it is other than .BAS); otherwise, only the filename is required. Then the number of the drive containing the program to be LLISTed is prompted. Pressing ENTER at that prompt will access Drive 0.

An added feature when using disk is the ability to press ENTER at the filename/extension prompt, followed by the drive number entry at that prompt, and have a disk drive directory pop onscreen. Pressing ENTER after the directory is displayed returns you to the filename/extension prompt.

The program will execute the machine language routine when Option 3 (LLIST Program) is selected from the

---

Clay Howe is a self-taught electronic and computer hobbyist. He has developed several hardware modifications for both the CoCo and radio control systems. When he can get away from his CoCo, and weather permits, he enjoys flying RC sailplanes.

Sugar Software

Special: Calligrapher font set #7 - Five new small fonts (this is "Roman"). $18.50 - Specify tape/disk; OS9/RSDOS. Deduct $5 on ANY additional program thru May 31, 1988.

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OS9 Calligrapher - (C) Although a different program from the CoCo Calligrapher, the OS9 Calligrapher prints all the same fonts. It reads a standard text file which contains text and formatting directives. You may specify the font to use, change fonts at any time, centering, left, right or full justification, line fill, margin, line width, page size, page break and indentation. Similar to *troff* on UNIX™ systems. Includes Gay Nineties, Old English and Cartoon fonts. Additional fonts are available (see below). Disk only; OS9 Level I or II; **$24.95**.

Calligrapher Fonts - Requires Calligrapher above. Each set on tape or disk; specify RSDOS or OS9 version; **$14.95** each. **Set #1** - (9 fonts) Reduced, reversed and reduced-reversed versions of Gay Nineties, Old English and Cartoon; **Set #2** - (8 fonts) Old Style and Broadway; **Set #3** - (8 fonts) Antique and Business; **Set #4** - (8 fonts) Wild West and Checkers; **Set #5** - (10 fonts) Stars, Hebrew and Victorian; **Set #6** - (8 fonts) Block and Computer;

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UTILITIES

Piratector - (100% ML) Utility to allow your own *disk-based* BASIC or ML programs to display a graphics title screen and then self-start after loading. Adds copy protection to your programs but still allows users to create *non-executable* backups! Includes Semigraf. Disk only; CoCo 1, 2, 3 (except Semigraf); **$30.95**.

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Color Disk Manager - (100% ML) Disk utility with these features: Disk repair, selective track initialization, verify sectors, backups, tape to disk transfer, ROM Pak execution from disk, much more! Tape/Disk; CoCo 1, 2, 3 (except for 64K mode); **$24.95**.

Color Tape Manager - (100% ML) Tape utility with these features: display start, end and exec address of ML programs, convert ML programs into *DATA* statements, append ML to BASIC, much more! Tape/Disk; 16K ECB; CoCo 1, 2, 3 (except for 64K mode); **$19.95**.

OS9 Patcher - (C) Display and modify the contents of a file or memory module. Hexidecimal, decimal and ASCII modes. Search feature. Calculates module CRCs; Generates patch command files. Disk only; OS9 Level I or II; **$19.95**.

INFORMATION MGT.

TIMS (The Information Management System) - (Hybrid BASIC/ML) Tape or disk, fast and simple general data base program. Create *files* of *records* that can be quickly sorted, searched, deleted and updated. Powerful printer formatting. Up to 8 *user* fields, sort on up to 3 fields. Tape/Disk; **$19.95** (see combo pkg below).

TIMS Mail - (Hybrid BASIC/ML) Tape or Disk based mailing list management program. Files are compatible with TIMS. Fast and simple to use. Supports labels 1, 2 or 3 across, 2½ to 4 inches wide. Tape/Disk; **$19.95** (see combo pkg below).

TIMS Utility - (Hybrid BASIC/ML) Utility companion for TIMS and TIMS Mail to allow multi-term search (*AND* and *OR* logic), global change and delete, split large files and more! Tape/Disk; **$14.95** (see combo pkg below).

TIMS Combo Package - All three of the above programs: TIMS, TIMS Mail and TIMS Utility on one disk - **$34.95**.

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Statistics programs for the coach, team manager or avid fan who wants to keep accurate team and opponent records. Printer output supported. The following are available: Baseball, Basketball, Football and Soccer. Disk only; **$19.95** each.

EDUCATIONAL

Trig Attack - (100% ML) Ages 9 and up. In this educational arcade game, enemy *trigs* travel along math curves. Players learn important mathematical concepts as they play. Sound effects, colorful graphics. Excellent manual includes an introduction to trigonometry. Tape 16K CB/Disk 32K ECB; CoCo 1, 2, 3; **$19.95**.

Silly Syntax - (Hybrid BASIC/ML) Ages 5 and up. Story creation game; output to screen or printer; includes 2 stories or create your own. Tape/Disk; **$19.95** or disk with 62 stories for **$20.95**. Sets of 10 stories on tape/disk for **$4.95**: Fairy Tales, Current Events, X-Rated, Sing-Along, Adventure, Potpourri.

Bible Stories Adventure - (Hybrid BASIC/ML) Ages 4 & up. A graphics adventure game for young children & their families. Old testament. Tape/Disk; **$19.95**.

The Presidents of the USA - (100% ML) Ages 10 and up. Two trivia games, user modifiable, printer output supported. Tape/Disk; 16K ECB; **$19.95**.

The Great USA - Ages 9 and up. Trivia game of the 50 states. Capitals, nicknames, abbreviations, flowers, trees and birds. Tape/Disk; 16K ECB; **$19.95**.

Galactic Hangman - Ages 7 and up. Exciting new twist to the popular word game. Outstanding graphics; 700 word vocabulary. Tape/Disk; 16K ECB; **$19.95**.

PreReader - (Hybrid BASIC/ML) Ages 3-5 (level I); Ages 5-7 (level 2); Great graphics and music. Level 1: match colors, shapes, letters and numbers; Level 2: match letters and consonant blends with their sounds. Tape/Disk; Joystick; **$19.95**.

Statgraf - High school and college level; Linear regression analysis program combined with a plotting and line graphing system. Up to 250 x/y pairs; data transformation; residuals; regression line; print graph with screen print program (not supplied); Tape/Disk; **$19.95**.

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CoCo Knitter - Easy to use program to display or print instructions to knit a sweater: Cardigan or Pullover; Round or V-neck; Raglan or Set-in Sleeve; 3 weights or yarn; 8 sizes from baby to man. Tape/Disk; **$19.95**.

Flying Tigers - (100% ML) Fast *Defenders* style arcade game. 5 levels of difficulty; Outstanding graphics and sound effects. Tape/Disk; Joystick; **$19.95**.

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All programe run on the CoCo 1, 2 and 3, 32K Extended Basic, unless otherwise noted. Add $1.50 per tape or disk for shipping and handling. Florida residents add 6% sales tax. COD orders add $5. Dealer inquiries invited. Orders generally shipped in 24-48 hours. No refunds or exchanges without prior authorization.

main menu. After the program to be LLISTed is loaded, the normal screen OK prompt will let you know that you may proceed with the normal LLISTing process. When the printer is online and the paper is properly set (a perforation a little above the print head will do), simply type LLIST and press ENTER, and your hard copy will be made using the column width, indentation, printout length and line skip values that were last in effect at the Change Defaults menu.

"The column width, indentation, printout length and line skip defaults may also be easily modified with just a few changes to the program."

You can use *Best List* without going to any of the configuration menus if all of the defaults match your requirements. Selecting the LLIST option at the main menu causes the program to jump to the READ DATA and initialization routine before it displays the LLIST Program menu. If you select the Change Defaults option, it will also jump to the initialization routine before the default menu appears.

After an LLIST has been made, you can do another with the same defaults by entering EXEC before entering LLIST — this resets the line counter in the machine language routine to zero. If you want to do another LLIST but with different defaults, just load and run the program again. If your CoCo has not been powered down, chances are the machine language routine will still be intact; and an initialization will not be performed at any prompt. You can make any desired default changes and proceed with the next LLISTing.

If, by rare chance, the screen blanks or the CoCo hangs up when trying to do a second LLIST, just turn the machine off for a few seconds, then start over again.

Machine language programs that are normally loaded with the command LOADM or CLOADM cannot be LLISTed using this program.

Whatever drive number you select when loading a program from the LLIST Program menu will become the default drive number until it is changed at that menu, or by entering DRIVEn (n= drive number desired) after an LLISTing is complete.

Customizing the Program

There are several things you can do to the program that will make it easier for you to use if you find that most of your LLISTing is done using the same configuration.

The first change you may want to make is the default printer baud rate. Some popular printers will work only at 600 or 1200 baud. Line 100 sets the baud rate with a poke to memory address 150; in this case a 1 is poked. The poke value is set up as the variable BD. To use another baud rate, just change the 1 in BD=1 to the value for the rate you want to use: 600 baud, BD=87; 1200 baud, BD=41; 2400 baud, BD=18; 4800 baud, BD=7.

The column width, indentation, printout length and line skip defaults may also be easily modified with just a few changes to the program. Any value that you want to change must first be converted from decimal to hexadecimal. For example, if you want the default column width to be 64, you would first convert 64 to Hex by entering on your CoCo the command ?HEX$(64). The screen would display the number 40, which is the Hex equivalent of decimal 64. The 40 would then be edited into the proper DATA position.

The value for column width is the 50 (*Hex*, remember?) at DATA position 4 in Line 530. The value for indentation is the 04 at DATA position 15 in Line 530. The printout length value is the 3C at DATA position 13 in Line 540. The line skip value is the 06 at DATA position 17 in Line 540.

Lines 530 and 540 each contain 18 DATA "positions," from 1 to 18. Reconfigure the *Best List* defaults by inserting the new Hex value at the appropriate DATA line position. Do not use zero when changing any of the default values in the DATA lines.

Program lines 530 and 540 are listed below with the DATA positions indicated:

```
530 DATA 96,9C,81,50,25,13,
86,0D,BD,A2,BF,86,20,C6,04,
BD,A2,BF
540 DATA 5A,26,FA,6C,8D,FF,
CE,A6,8D,FF,CA,81,3C,25,CF,
C6,06,86
```

Don't forget to save the customized version before you proceed with LLISTing. If you don't save it, you'll lose it!

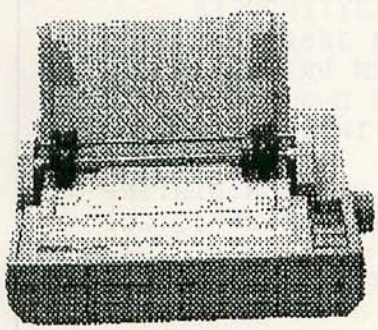
Lines	Description
100-150	set up both numeric and string variables for later use. Line 120 determines if the system is cassette- or disk-based.
500-550	contain the data that is read in by the READ DATA routine and poked into memory. It will then be the machine language LLIST routine.
1000-1090	used for the main menu.
1500-1640	used for the printer baud menu. Line 1610 contains a short string that is converted by a MID$ function to select a baud rate. Be sure that a character (0 is used) preceeds the 87 in the string.
2000-2120	the READ DATA routine. This is where the DATA in lines 500 and 550 are converted to the machine language LLIST routine.
2500-2660	take care of the default menu and any changes you make while using this option. Lines 2620 through 2650 do the actual pokes when changes are made. Note that lines 2640 and 2650 poke two locations to match the printout length to the line skips.
3000-3150	contain the LLIST menu and the routine to get the program you want to LLIST, do a directory and select a drive number if a disk system is being used, or prompt the proper cassette setup for such a system, and load the program to be LLISTed.
3500-3510	the subroutine that waits for a key press and is accessed by almost all of the input prompts.

(Questions or comments about this program may be directed to the author at 310 S. Jefferson St., Sturgis, MI 49091. Please enclose an SASE when writing for a reply.) □

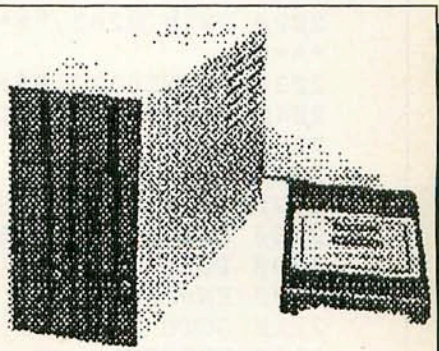
530	28	2650	151
1540	193	END	202
2520	61		

The listing: BESTLIST

```
10 '*************************
20 '**   LLIST FORMATTER    **
30 '*************************
40 '**   BASIC LOADER FOR   **
50 '**       FLIST/BIN      **
60 '** ML CODE BY C.ROSLUND **
70 '** DECEMBER 1982 ISSUE  **
80 '**    OF THE RAINBOW    **
90 '*************************
100 BD=1:POKE150,BD:'** BAUD RAT
E **
110 A$=STRING$(32,188):B$=STRING
$(32,179)
120 DV=PEEK(188):ST=DV*256
130 FORX=ST TO ST+103:POKEX,&HFF
:NEXTX
140 IF DV=6 THEN C$="CASSETTE" E
LSE IF DV=14 THEN C$="  DISK":PO
KE&H95A,0
150 L$="* * * LOADING * * *":L1$
="READY PRINTER-LLIST AT OK PROM
PT"
160 '*************************
500 DATA 6F,8D,00,19,BE,01,68,AF
,8C,11,30,8C,11,BF,01,68,86,7E
510 DATA B7,01,67,86,39,A7,8C,EA
,39,00,00,00,34,17,D6,6F,C1,FE
520 DATA 27,06,35,17,6E,9D,FF,EF
,81,0D,26,06,6C,8D,FF,E9,20,F0
530 DATA 96,9C,81,50,25,13,86,0D
,BD,A2,BF,86,20,C6,04,BD,A2,BF
540 DATA 5A,26,FA,6C,8D,FF,CE,A6
,8D,FF,CA,81,3C,25,CF,C6,06,86
550 DATA 0D,BD,A2,BF,5A,26,F8,6F
,8D,FF,B8,20,BF,XX
560 '*************************
1000 CLS:PRINT:PRINT:PRINTA$;
1010 PRINT"      **** MAIN MENU
****"
1020 PRINTA$;
1030 PRINT:PRINT"      <1> SET P
RINTER BAUD"
1040 PRINT:PRINT"      <2> CHANG
E DEFAULTS"
1050 PRINT:PRINT"      <3> LLIST
```

COCO ACCESSORIES



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```
 PROGRAM"
1Ø6Ø PRINT:PRINTB$;
1Ø7Ø GOSUB 35ØØ
1Ø8Ø A=VAL(Q$):IFA<1 OR A>3 THEN
 1ØØØ
1Ø9Ø ON A GOSUB 15ØØ,25ØØ,3ØØØ
11ØØ '************************
15ØØ CLS:PRINT:PRINT:PRINTA$;
151Ø PRINT"      **** BAUD MENU
****"
152Ø PRINTA$;
153Ø PRINT:PRINT"           <1> -
  6ØØ"
154Ø PRINT"           <2> - 12ØØ"
155Ø PRINT"           <3> - 24ØØ"
156Ø PRINT"           <4> - 48ØØ"
157Ø PRINT"           <5> - 96ØØ"
158Ø PRINT:PRINTB$;
159Ø GOSUB 35ØØ
16ØØ Q=VAL(Q$):IFQ<1 OR Q>5 THEN
 15ØØ
161Ø E$="Ø874118Ø7Ø1"
162Ø BD=VAL(MID$(E$,(Q*2),2))
163Ø POKE 15Ø,BD
164Ø GOTO 1ØØØ
165Ø '************************
2ØØØ CLS:PRINT@128,A$;
2Ø1Ø PRINT@198,"***** READING **
***"
2Ø2Ø PRINT@262,"***** D A T A **
***"
2Ø3Ø PRINT@32Ø,B$;
2Ø4Ø PRINTTAB(11)C$:PRINTB$;
2Ø5Ø EN=ST
2Ø6Ø READ D$
2Ø7Ø IF D$="XX" THEN 212Ø
2Ø8Ø C=VAL("&H"+D$)
2Ø9Ø POKE EN,C
21ØØ EN=EN+1
211Ø GOTO 2Ø6Ø
212Ø RETURN
213Ø '************************
25ØØ IF PEEK(ST)<>&H6F THEN GOSU
B 2ØØØ
251Ø CLS:PRINT:PRINT:PRINTA$;
252Ø PRINT"    **** DEFAULT MENU
 ****":PRINTA$;
253Ø PRINT:PRINT"  <1> - COLUMN
WIDTH ---->"PEEK(ST+57)
254Ø PRINT"  <2> - INDENTATION -
---->"PEEK(ST+68)
255Ø PRINT"  <3> - PRINTOUT LENG
TH ->"PEEK(ST+84)
256Ø PRINT"  <4> - SKIP LINES --
---->"PEEK(ST+88)
257Ø PRINT"  <5> - MAIN MENU"
258Ø PRINT:PRINTB$;
259Ø GOSUB 35ØØ
26ØØ Q=VAL(Q$):IFQ<1 OR Q>5 THEN
 251Ø
261Ø ON Q GOTO 262Ø,263Ø,264Ø,26
5Ø,1ØØØ
262Ø PRINT@217,;:INPUTCW:IFCW<1
OR CW>255 THEN262Ø ELSE POKEST+5
7,CW:GOTO 251Ø
263Ø PRINT@249,;:INPUTID:IFID<1T
HEN263Ø ELSE POKEST+68,ID:GOTO 2
51Ø
264Ø PRINT@281,;:INPUTPL:IFPL<1
OR PL>65 THEN264Ø ELSE POKEST+84
,PL:POKEST+88,(66-PL):GOTO 251Ø
265Ø PRINT@313,;:INPUTSL:IFSL<1
OR SL>65 THEN265Ø ELSE POKEST+88
,SL:POKEST+84,(66-SL):GOTO 251Ø
266Ø RETURN
267Ø '************************
3ØØØ IF PEEK(ST)<>&H6F THEN GOSU
B 2ØØØ
3Ø1Ø CLS:PRINT:PRINT:PRINTA$;
3Ø2Ø PRINT"     **** LLIST MENU
****":PRINTA$;
3Ø3Ø IF PEEK(ST)<>&H6F THEN GOSU
B 2ØØØ:GOTO 3Ø1Ø
3Ø4Ø IFDV=14 THEN F1$=" FILENAME
/EXT" ELSE F1$=" FILENAME"
3Ø5Ø PRINT@384,B$;
3Ø6Ø PRINT@192,F1$;:INPUTF$
3Ø7Ø IFDV=14 THEN 3Ø8Ø ELSE 313Ø
3Ø8Ø IF F$="" THEN PRINT@21Ø,"di
rectory":D=1 ELSE D=Ø
3Ø9Ø PRINT@224,;:INPUT" DRIVE NU
MBER - ";DN
31ØØ IF D=1 THEN DRIVEDN:DIR:INP
UT"        PRESS <enter>";Q:GOT
O3Ø1Ø
311Ø PRINT@294,L$:PRINTL1$;:PRIN
T@416,;:
312Ø EXECST:DRIVEDN:LOAD F$
313Ø PRINT@224,;:INPUT" READY CA
SSETTE - <enter>";Q
314Ø PRINT@294,L$:PRINTL1$;:PRIN
T@416,;:
315Ø EXECST:CLOAD F$
316Ø '************************
35ØØ Q$=INKEY$:IFQ$=""THEN35ØØ
351Ø RETURN
352Ø '************************
353Ø '**  BASIC LOADER BY:    **
354Ø '**       CLAY HOWE      **
355Ø '**  STURGIS, MICHIGAN   **
356Ø '**    (616)-651-4248    **
357Ø '************************
358Ø '**     NOVEMBER 1985    **
359Ø '************************
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PRINTER OVERVIEW

By Ed Ellers
Rainbow Technical Editor

You might think the typical RAINBOW reader would have upgraded his or her system to include a 512K CoCo 3, an RGB monitor, a 1200 baud modem and a dot matrix printer, but a lot of our readers are just starting out and haven't worked their way up yet. It is still probably safe to say the typical CoCo user either has a printer, wants to buy one, or wants to upgrade to a better one. Rather than try to give a detailed buyer's guide, this will be an overview of the six basic types of printers (dot matrix, daisy wheel, laser, thermal, ink-jet and pen plotter) that CoCo users might be interested in, with an explanation of common features and what to look for.

Dot Matrix

This is the most popular type of printer among CoCo users, as well as the most common type of printer for personal computers in general. Why? Because it's also the most versatile type of printer; a good dot matrix printer can usually serve all but the most specialized applications you may have for a printer.

Dot matrix impact printers use a series of wires in the print head to transfer the image through an inked ribbon to the paper. This type of printer is versatile because it's not limited to printing a fixed set of characters; it can also print any image that can be converted to a dot pattern. A typical dot matrix printer uses this capability to print both "bit-image" graphics that are fed into the printer and various sizes of type, ranging from type so small that it can barely be read to type big enough for almost any headline.

The most common difference between printers is the available resolution, and that usually depends on the number of wires in the print head. A low-end printer like the Tandy DMP-130 will usually have a nine-wire print head; since the wires in a print head normally extend over a one-eighth inch area, this works out to 72 dots per inch. Resolution can be extended by multiple-pass printing to a typical limit of 216 dpi, though this does tend to slow down the printing process. The high-speed print modes of such a printer typically use a 7-by-9 character set, giving rather coarse "computer-style" type; but the trend in recent years has been to add a two-pass "near letter-quality" mode that provides a more attractive 14-by-18 font. Most nine-wire printers today have this feature.

More expensive printers often have an 18- or 24-wire print head, which gives higher resolution and greater speed than a nine-wire printer. The 18-wire type, such as the Okidata Microline 292, gives the same resolution at full speed as a nine-wire printer would when slowed down; at higher resolutions (288 dpi is practical here) they do slow down somewhat. The 24-wire printers give even better resolution; 360 or 384 dpi is not unheard-of here, and that's starting to get into laser territory. Some corporations are using 24-pin printers for important correspondence, because their character sets aren't so easily identified as having come from a computer. (High-quality carbon film ribbons, like the ones used with office typewriters and daisy wheel printers, are becoming available for dot matrix printers.)

The other new feature that's starting to catch on, though slowly, is color printing. Some of the latest dot matrix printers can use a four-color ribbon

Ed Ellers, a RAINBOW and PCM staff member, is a self-confessed electronics fanatic who takes time off to pursue other interests including science fiction.

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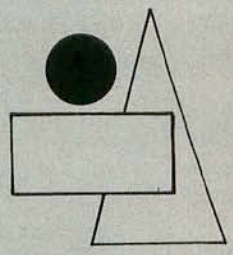

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(black, yellow, magenta and cyan) that moves up and down on command. Although this type of printing is fairly slow, requiring four times the number of passes as a straight black-and-white printout, amazingly good results can be obtained. (These printers generally will accept a standard black ribbon that can be used for normal work, so that you don't waste the color ribbon by using up the black portion prematurely.)

As for compatibility, the Epson printer code set is so well accepted these days — even by IBM, whose standard printer codes are similar to those of Epson printers — that almost all dot matrix printers, including the present Tandy line, support either Epson or IBM printer control codes. New CoCo software packages often support Epson printers and compatibles as well, so most of the printers you'll come across should work well with the Color Computer. On the hardware side, most of Tandy's dot matrix printers (all but the most expensive models) do support the CoCo's serial I/O port, though the speed is limited to a typical value of 1200 or 2400 baud. With other brands of printers you'll need either an RS-232 board that mounts inside the printer (and which is only available for some printers) or an external serial-to-parallel converter box, like the ones from Metric Industries and Dayton Associates, that just connects between the CoCo and a parallel printer.

```
Laser Printer (Courier type)

The quick brown fox jumped over the lazy dog's back.


Daisy Wheel Printer (Courier type)

The quick brown fox jumped over the lazy dog's back.


9-Pin Dot Matrix Printer (Two-Pass NLQ Mode)

The quick brown fox jumped over the lazy dog's back.


9-Pin Dot Matrix Printer (Speed Mode)

The quick brown fox jumped over the lazy dog's back.


24-Pin Dot Matrix Printer

The quick brown fox jumped over the lazy dog's back.
```

Figure 1

Daisy Wheel

These printers (and some related types, such as the NEC Spinwriter and IBM Selectric) used to be the most common way to obtain letter-quality text, because they print actual characters from a type element rather than bit images. Unfortunately, they tend to be rather slow and noisy, and for that reason (as well as their inability to print graphics images well) they're being steadily replaced by the better dot matrix printers and by laser printers. If you do have a real need for letter-quality type, some daisy wheel printers are selling for under $300 these days; but you might also consider putting the money toward a high-quality dot matrix unit instead.

Laser

Laser printers have become increasingly popular in recent years as a high-quality, highly flexible way of printing text and graphics. These printers combine a scanned laser beam and a copier mechanism, creating a bit image in RAM and then using a solid-state laser to draw that image on the copier drum, which then transfers the image to plain paper in the usual copier fashion. Even though prices have come down somewhat within the past year, they still normally run over $2,000 and would therefore seem to be a bit expensive as an adjunct to a Color Computer system.

Nearly all of the less-expensive laser printers are designed to emulate the Hewlett-Packard LaserJet Plus, although in many cases (Tandy's LP-1000, at $2,199, being one of them) the printer either does not accept HP font cartridges or doesn't use cartridge fonts at all. A number of these printers also emulate either Epson or IBM dot matrix printers (the LP-1000 emulates both the IBM Proprinter and Tandy's dot matrix printers) and can therefore be used reasonably well with the CoCo as long as you can set the printer for the auto line feed mode that the CoCo uses. Some laser printers (such as HP) won't allow this mode change at all, so check the manual before buying.

Thermal

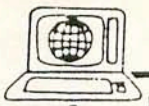
These printers were introduced a number of years ago in an attempt to produce a less expensive type of printer. The original thermal printers required special (and somewhat expensive) paper and produced relatively poor printouts, so they quickly fell from favor as soon as dot matrix printer prices became more competitive. A variation on the basic theme is the thermal transfer printer, which uses a special ribbon to print on plain paper; the Okimate 10 and 20 are examples of this type of printer, which can also be used with thermal paper. The major advantage of thermal transfer printers (aside from somewhat lower cost) is their very low noise level.

Ink-Jet

These printers use a thin jet of ink to draw a bit image on paper. They were originally developed to provide a low-cost way to print multiple-color images (as in the now-discontinued Tandy CGP-220), but most of the ones still on the market, such as the HP ThinkJet, are used in applications where low noise levels are needed, such as in search-and-retrieval systems in libraries.

Pen Plotters

These have long been used in engineering applications to make detailed drawings, but with one exception — the Tandy CGP-115 introduced a few years ago — they haven't made much of a dent in the personal computer market. Their main drawback is the rather poor text they produce, since they "draw" the characters as a series of pen strokes.



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Transferring centered headings to the DMP-110

Center That Header

By Doug Anderson

Centering a heading is easy enough on the video monitor: Just use the PRINT TAB or PRINT@ commands. Transferring a centered heading onto your printer may require more work, however. In this tutorial, you'll get a simple one-line subroutine, plus the necessary background to successfully incorporate this into your own programs.

Unless you are using special fonts (like elongated italics), you can use the following command:

```
PRINT TAB(80-LEN(R$)/2)R$
```

This will work in any case where you are using standard printing (and if your printer has an 80-character line). In other cases, where the length of the line differs, you may need something that looks a little more elaborate (but really isn't):

```
10 R=LEN(R$)
20 S=R*Z
30 T=960-S
40 U=T/2
50 N1=U/256
60 N1=INT(N1)
70 N2=U-(N1*256)
80 PRINT #-2, CHR$(27);CHR$
(26);CHR$(N1);CHR$(N2);R$
```

This really isn't as intimidating as it looks. We'll break it down step by step. First, a word of caution: This works on a CoCo 2 with a DMP-110 printer. If you have other equipment, you'll need to change some of the parameters that appear in this tutorial. We'll explain as we go along.

The first step is to ascertain the total width of the printed line (in dots). For the DMP-110, this is 960 dots. If you have another type of printer, the value may differ. Check your printer manual.

The second step is to determine the width of the character that you will be using. This is the value of Z in Line 20. For a DMP-110, a standard character is nine dots wide; italics are 12 dots wide, and elongated characters are twice the usual width (18 for standard print, and 24 for elongated italics). If you will be using only one type font for your headers, just replace Z with an appropriate value. Otherwise, specify a value for Z within the program.

In this tutorial, R$ is the line that we want to print on the form we are designing. We want to center R$. So, the first step is to find the length of the line (the number of characters). We find this from 10 R=LEN(R$).

Next, we want to find the length of R$ as measured by the number of dots each character will occupy in the line. Let's say that we want to print our heading in elongated italic type. As we learned above, each character in elongated italic is 24 dots wide. Thus, 20 S=R*Z.

Now, we want to find the total

Doug Anderson is an attorney who loves computers, roses and science fiction.

number of spaces left over on the line after we have printed our string. On the DMP-110, the total length of the line is 960 dots. From Line 20, the value of S is the total number of dots our heading will use. Thus, the amount of blank space will be `30 T=960-S`.

To center the string, we want a value that is one-half of the value of T derived from Line 30. The next calculation that we need to perform is `40 U=T/2`.

The value of U in Line 40 is the amount of space that we need to TAB in order to center our header. However, we need to transform this value into two numbers that the printer will recognize. For the DMP-110, the print command is:

```
80 PRINT#-2,CHR$(27);CHR$(16)
;CHR$(N1);CHR$(N2);R$
```

Those of you who are familiar with printer codes will recognize that the first part of the command tells the printer we want to center R$. (For the rest of us, it's that part of Line 80 that reads: `PRINT#-2,CHR$(27);CHR$(16);`.

The last half of this command, `CHR$(N1);CHR$(N2);`, is our next concern. This gets a bit complicated, so reread the next couple of paragraphs until you are comfortable with what we are going to do. If you need additional help, check your printer manual, or *How to Use Your Radio Shack Printer*, by William Barden, Jr.

The value N1 is a multiple of 256. N2 is the remainder. Together, these values tell the printer how far to TAB. We determine the value of N1 by finding out how many times 256 may be divided into the value of U (which we determined in Line 40). This calculation is `50 V=U/256`.

Because N1 must be an integer, we need Line 60: `60 N1=INT(V)`. N2 is the remainder. This is the difference between N1*256 and U (the amount of space we want before we start printing R$). Therefore, `70 N2=U-(N1*256)`. If it's easier, you might want to think of the N1/N2 combination as a number expressed in Base 256.

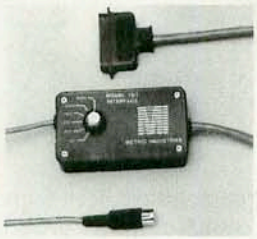
Let's look at these steps again.

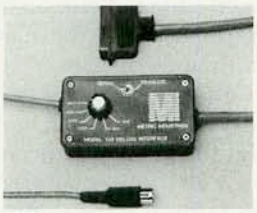
```
10 R=LEN(R$): REM THE NUMBER
OF CHARACTERS IN R$
20 S=R*24: REM 24 IS THE
LENGTH OF EACH CHARACTER IN
ELONGATED ITALIC
30 T=960-S: REM THIS IS HOW
MUCH SPACE IS LEFT OVER AFTER
WE PRINT R$
40 U=T/2: REM THIS IS THE
NUMBER OF SPACES BEFORE WE
START PRINTING A CENTERED R$
50 N1=U/256: REM HOW MANY
TIMES CAN 256 BE DIVIDED
INTO U
60 N1=INT(N1): REM N1 HAS TO
BE AN INTEGER
70 N2=U-(N1*256): REM N2 IS
THE REMAINDER
80 PRINT#-2,CHR$(27);CHR$
(16);CHR$(N1);CHR$(N2);R$
```

When we put it all together, it looks like this:

```
100
R=LEN(R$):S=R*Z:T=960-S:U=T/
2:V=U/256:N1=INT(V):N2=U-(N
1*256):PRINT#-2,CHR$(27);
CHR$(16);CHR$(N1);CHR$(N2)
;R$
```

(Questions or comments regarding this tutorial may be directed to the author at 1038 NE 21st St., Apt. 24, Hillsboro, OR 97124. Please enclose an SASE when requesting a reply.)





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Sample printout

Bulletin Board Standout

By George Quellhorst

For several years, I have been searching for a Color Computer program to print a neat little bulletin board-type poster as opposed to the many banner printers floating around.

Never once did I have the inclination to write such a program myself, until Radio Shack put the DMP-130 printer on sale, and I saw all those small triangles and squares built into the printer's ROM, the perfect building blocks for alphanumeric characters. The result is this program, which uses the graphics blocks of the DMP-130 to form every keyboard character, except one, to print those little posters.

When the program was first written, it would only work on the Color Computer 3, but I have reworked the program into two parts sharing the same

George Quellhorst lives in Painesville, Ohio, and has had a CoCo since the 4K days. He enjoys writing programs on his two CoCo 2s and a CoCo 3 with RGB monitor.

DATA statements and printing routines. One makes use of the 32-column screen and the inverse video of the Color Computer 1 and 2, and the other takes full advantage of the CoCo 3's 40- and 80-column screens with the true lowercase.

The Program

With the exception of the left, right and down arrows, all the keyboard characters are printable, including the SHIFT-CLEAR or reversed slash. The SHIFT-up arrow is used as the only control key in the program.

A total of 98 "blocks," or modules of six graphics characters, were needed to construct all of the characters on the keyboard. The sixth one in each module is CHR$(224) or a space. By changing the printer codes, a total of four different character widths, or line lengths, are available. Making the spaces between characters part of each character results in a space between characters that is always proportional to the character being printed. Therefore, the resulting final product will have nice uniform spacing at any character width or line length.

Lines 100 through 112 contain the data for our modules, which are read in the first part of Line 279. After the data is read, we have 98 variables in memory, each containing a group of six graphics characters, A$(X,Y), the last one being A$(98,6).

Lines 150 through 240 hold the DATA statements for each one of the 90 characters this program is capable of printing. For example, Line 201 is the capital 'S'. In order to print an 'S', modules 1,14,14,34,15,15,4,11 and 11 have to be printed. The second half of Line 279 puts the variables for each of the 90 characters in memory using the variable L(X,Y), L(90,9) being the last one (the lowercase 'z').

The first printable character is the exclamation mark or CHR$(33). The last one is the lowercase 'z' or CHR$(122). By putting the character data in order of their ASCII value, all we have to do is subtract 32 from this in order to be able to read the corresponding DATA statement for any given character. We do that in Line 19 of the program.

If we just had to print a single character, this program would be done by now. However, we may have to print up to 22 characters across the width of the paper. In that case we have to print the top module of each of the 22 characters, do a line feed, and go back to print the next row of 22 modules. This process is repeated until all 22 characters on the first line of the poster are printed. If you have trouble visualizing multidimensional arrays, I recommend you check out the program by Robert E. Laun in the April 1987 RAINBOW called "Enter the Fifth Dimension." This will give you a good idea as to how this program works, since we are dealing with a four-dimensional array.

BASIC programming can be a lot of fun, once you teach yourself how to "think" like a computer.

The Input Sections

Up to 11 lines of material may be printed on a single sheet of printer paper, in line widths of 8, 13, 16 and 22 characters per line. The height, however, will remain constant. By changing the printer codes, the width of each character is either elongated or compressed. Therefore, an eight-column character is twice the width of a 16-column character.

When I was working on the input section, it occurred to me that it would be nice if you could design and lay out an entire poster before it was actually printed. On the wide 80-column screen of the CoCo 3, it was easy enough to do. The 32-column screens on the CoCo 1 and 2 were a little harder, however. The layout alone consumes the entire 32-column screen.

Since some of the early model CoCos would not work with the speed-up poke, it is not in effect in the CoCo 1 mode.

The CoCo 3 has to be in the CoCo 2 or 32-column screen mode when the program is run for the first time. The

Sample printout (reduced 60 percent)

title screen asks you to press 1, 2 or 3 to indicate which model you have. Depending on the number entered, the program then switches to either a 32- or 80-column input screen.

The input screen displays the numbers 1 through 11 and a cursor immediately behind the number 1. The first thing you must enter is the line width for the first line. Take into consideration what you want to print and how big you want your letters to be. For example, if the first line is a header and all you want to print is "SALE," use the largest character available to make it stand out better. The line width input will not accept anything other than 08, 13, 16 or 22. I wrote it that way since 23, for example, would result in an FC or OD Error, should you try to print your poster. Note that you must enter a leading 0 before the 8.

After you type in the line width and press ENTER, the program will print two brackets on the screen immediately behind this number. The spaces between the brackets equal the line width plus one. If you type the word SALE and press ENTER, *Poster Printer* will center "SALE" on your printer paper. However, pressing ENTER just before the right bracket prints the word "SALE" on the left side of the paper. Therefore, to center a word or sentence, press ENTER immediately after that word or phrase. To justify left, press ENTER in front of the last bracket.

To print an "empty line," enter any line width and press ENTER-ENTER. Presto! A line containing nothing but spaces is entered. To stop the input and start printing a poster, enter any line width and press the SHIFT-up arrow and ENTER. The screen will show a left arrow, and the program will be routed to a display screen. You'll be asked whether or not you want to print.

Line up the perforation on your paper with the print head, and the poster will also be centered vertically. Once the first poster is printed, the paper will line itself up to print the next one.

Once your poster has been printed, you have three options. You may print the same poster again, enter a new poster, or quit.

Line 273 starts the 32-column screen input. POKE282,0 puts your computer in the lowercase mode. A POKE282,255 returns it to all uppercase. The next line prints the numbers 1 to 11 and the available line widths on the screen. Since we want to be able to lay out an entire poster at one time, we must put all of the inputs inside a FOR-NEXT loop in order to assign a variable to each line. Line 274 does that.

Our first input is B$(F), the line width. This is used to calculate the margin in conjunction with the length of the next input, A$(F), which is the actual text for the first line. The last part of Line 275 checks to see if you entered a valid line length. Line 276 makes sure your input is not a CHR$(95) or SHIFT-up arrow. If it is, your input is terminated, and the program jumps to Line 278, which restores the uppercase, resets the speed-up poke and creates a flag, CT=1, to let the program know that it is in the CoCo 2 mode. If A$(F)<>CHR$(95), then S=S+32:NEXTF adds 32 to S, the next input's printout location, and routes the program back to get the second line of the poster we are creating.

Once you have typed in 11 lines of copy or entered a CHR$(95), the input is finished. All the variables we need to print the poster are in memory, and lines 9 to 13 display the input on the screen. You are asked if you want to print this poster the way it was entered. If you do not, we return to Line 273 to start over again. If you do, all sorts of things happen.

First of all, your printer may still be in its elongated mode from printing a previous poster or line. This command must be cancelled, just in case your next line does not need elongation. Second, we have to send a half-forward line feed. Because this has to be done each time a new line is printed, the printer codes are placed inside the FOR-NEXT loop that does the actual printing. We created two new variables in Line 9, PC(D) and LC(D). PC(D) is the line width and LC(D) is the line length for the line being printed.

In Line 15, DQ determines the position of the print head at the start of each line. Presuming a line length of 13, the program does a GOSUB304, thus sending out the control codes for the line width wanted, in this case a standard 10 cpi character. By taking a look at the printer handbook, we see that in this mode there are a total of 960 dots across the width of the paper, of which every other one can be addressed, leaving us with 960÷2 or 480 dots. By printing a line full of characters, we discover that it requires 13 poster characters to fill a page from left to right. Therefore, one character is 480÷13 or 36 dots wide. In order to calculate the left margin and center this line on your paper, multiply LC(D), the line length, by 36 and subtract the result from 480. After this is divided by 2, we have our variable DP, which will determine the start position of the print head when we return to Line 16.

Even though we have sent the start position of the print head to the printer, there are still a few things left to check before we can start with the actual printing of the first line. The program comes back to this same place every time a new line needs to be printed. Therefore, we must first make sure that there is something left to be printed.

A$(D), our line to be printed, is checked in Line 17. If A$(D)="", we are dealing with an empty line. FORI=1TO11:PRINT#-2:NEXTI takes care of that chore and the NEXTD in Line 23 routes us back for the next line.

Remember that CHR$(95) or SHIFT-up arrow in the input section? Well, Line 18 checks for that and stops the printing in case A$(D) happens to be CHR$(95). This line also checks the value of CT, our flag that lets the program know what kind of computer you have. If CT=1, the program goes to Line 28, and if CT=0, it jumps to Line 24. In both cases, you'll have the three end options discussed earlier.

Printing the Poster

Lines 19 through 23 are the soul of *Poster Printer* because your entire poster is being printed in these four lines.

First of all, we should look at all the variables we told the computer to remember. Line 279, A(X,Y), the first thing read into the memory of our machine, holds the graphics used to construct characters. Since X=1TO98 and Y=1TO6, A(1, 1 through 6) will contain a block of six graphics characters. Ninty-eight such blocks are now in memory with the very last of these being A(98, 1 through 6), for a grand total of 98 x 6 or 588 separate graphics DATA statements.

Secondly, we have L(X,Y) containing the data for each one of the 90 characters this program is capable of printing. After this second READ statement, we also have L1 through L90 in memory, each holding nine-character DATA statements, L(1, 1 through 9) being the first character, the exclamation point and L(90, 1 through 9) being the last one, the lowercase 'z'. Thus, a total of 90 x 9 or 810 DATA statements.

If that were not enough, we also have cramped the entire poster in our poor computer's memory. The poster is

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stored in A$ (1 through 11) where A$(1) is the first line of our copy, and A$(11) the last line. Now that all that stuff is loaded and stored in variables, we can bring it together and tell the computer to print our poster.

Because a single poster may contain up to 11 lines of copy, we use the first FOR-NEXT loop in Line 14, FORD=1TO11, to hold those lines. Then we open another FOR-NEXT loop inside the previous one for the nine lines of data each printed line requires, FORT=1TO9 in Line 16. Because this is the start of each of the nine lines of graphics data, the command that positions the print head is inserted next. FORQ=1TOLEN(A$(D)), which is the third loop, simply states FOR Q=1 TO (the length of this line). The last one, FORY=1TO6, is for the six blocks of graphics that make up the modules we constructed earlier.

If we put all those loops within loops together, it would look like this: FORD=1TO11:FORT=1TO9:FORQ=1TOLEN(A$(D)):FORY=1TO6:NEXTY:NEXTQ:NEXTT:NEXTD. As you may know, FOR-NEXT loops within FOR-NEXT loops are executed in reverse order. In our case, the computer will first count all the Ys, then the Qs, followed by the Ts, and finally the Ds.

Now we have all the information necessary to tell the computer what to print. Presuming the first line of our poster reads "SALE," the following occurs: Y=1, Q=1, T=1 and D=1. Since D is still equal to 1, A$(D) is really A$(1), in this case the word "SALE." If we take a look at Line 19, we see that V is the ASCII value of the first character in A$(D)-32. V, therefore, is the ASCII value of S-32 or (83-32)=51. The next time around, Q will be 2 and V will equal the ASCII value of MID$(A$(D),2,1) or the second letter, the 'A'.

Line 20 does the actual printing: PRINT#-2,CHR$(A(L(V,T),Y));. We have two arrays in memory containing data, the A array, which holds the data for the graphic characters, while the L array holds the data needed to print each keyboard character. The data we want to send to the printer is held within the A array. The value of V is like a pointer telling the A array which data to print. Since the character data is arranged in ascending order according to their ASCII value, and V equals 51, the 51st line in those DATA statements contains the information we need to print the letter 'S'. Remember all our variables in the FOR-NEXT loops are still one. L(51,T) is therefore the first number in that line, which is in this case a 1 (the data for the 'S' is in Line 201).

Now let's take another look at Line 20, replacing the L(V,T) in our mind with the number 1. The result is PRINT#-2,CHR$(A(1),Y). Here again, Y still equals one, thus CHR$A(1,1), which just happens to be the first DATA statement in the graphics data, is dumped to the printer.

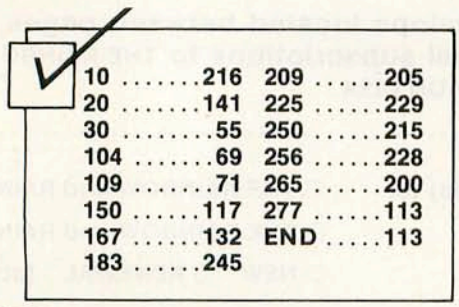
NEXTY will print the remainder of the graphics blocks needed to print the top of the 'S'. After all the Ys are printed, we start with the Qs. Since Q is now 2, V will equal the ASCII value of the A. This continues until the whole top row of the word "SALE" has been printed and Q is equal to the length of A$(D). As you know, we are using a 9-by-6 matrix; therefore, it will take nine passes to print "SALE." NEXTT finishes printing the rest of our first line. NEXTD starts the whole thing all over again and prints lines 2, 3, 4, etc.

I would like to mention one more thing. Look at Line 19: IFV=0THEN PRINT#-2:CHR$(32):GOTO 21. Because we subtract 32 from the ASCII value of our character, V will equal 0 only when the ASCII value of the character is 32 or a space. In this case, we have to print six "blocks" of spaces rather than graphics characters. The PRINT#-2,CHR$(32) does just that; and since we GOTO 21 or NEXTY, six spaces will be printed, which is the exact width of a character.

Finally, if you look through the DATA statements, you will see two lines containing nothing but 0s. They are CHR$(95) and CHR$(96). One is the SHIFT-up arrow, which we use as our only control key. And the last one is the underline, which would be a printable character except that it is not a keyboard character; therefore, it cannot be used because there is no keyboard key that sends a CHR$(95) to the printer. The 0s were needed to keep the count of V in line. Lines 300 to 307 are the printer code GOSUBs. You will notice a single- and double-strike line for each line width. You may change the line numbers in Line 15 to print your poster in the double-strike mode.

If you don't have an RGB monitor, change the PALETTERGB in Line 254 to PALETTECMP.

(Questions or comments regarding this program may be directed to the author at 63 South State Street, Painesville, OH 44077. Please enclose an SASE when writing for a response.) □



10	216	209	205
20	141	225	229
30	55	250	215
104	69	256	228
109	71	265	200
150	117	277	113
167	132	END	113
183	245		

The listing: POSTRPTR

```
1 PCLEAR1:CLEAR2000:DIMA(98,6),L
(90,9),A$(11),B$(11),PC(11),LC(1
1)
2 POKE150,18:GOSUB250:Z$=STRING$
(30,32)
3 CLS:LOCATE9,0:ATTR3,2:PRINT"PR
INT THIS <";:ATTR3,2,B:PRINT"Y";
:ATTR3,2:PRINT"> OR <";:ATTR3,2,
B:PRINT"N";:ATTR3,2:PRINT">O";:A
TTR1,0:LOCATE38,0
4 FORD=1TO11:PC(D)=VAL(B$(D)):LC
(D)=LEN(A$(D)):IFPC(D)=8THENB$(D
)="08"
5 D$=STR$(D):IFVAL(D$)<=9THEND$=
"0"+RIGHT$(D$,1)ELSED$=RIGHT$(D$
,2)
6 K$="Line:"+D$+".("+B$(D)+"): "
+A$(D):LOCATE2,(D*2):ATTR0,0:PRI
NTK$:NEXTD:ATTR1,0:LOCATE38,22
7 ATTR0,0:P$=INKEY$:IFP$="Y"THEN
8ELSEIFP$="N"THEN256ELSE7
8 PRINT#-2:PRINT#-2:LOCATE8,0:PR
INTZ$:LOCATE8,0:ATTR3,2,B:PRINT"
N O W   P R I N T I N G";:ATTR1,
```

```
Ø:LOCATE38,Ø:ATTR1,Ø:GOTO14
9 S=64:CLS:PRINT@4,"PRINT THIS <
Y>ES OR <N>Ø":PRINT@32,STRING$(3
2,45);:FORD=1TO11:PC(D)=VAL(B$(D
)):LC(D)=LEN(A$(D)):IFPC(D)=8THE
NB$(D)="Ø8"
1Ø D$=STR$(D):IFVAL(D$)<=9THEND$
="Ø"+RIGHT$(D$,1)ELSED$=RIGHT$(D
$,2)
11 S=S+32:PRINT@S,D$;".(";B$(D);
"):";A$(D):NEXTD
12 P$=INKEY$:IFP$="Y"THEN13ELSEI
FP$="N"THEN273ELSE12
13 PRINT#-2:PRINT#-2:PRINT@4,"N
O W    P R I N T I N G";
14 FORD=1TO11:PRINT#-2,CHR$(27);
CHR$(28);CHR$(27);CHR$(15);CHR$(
27);CHR$(85);CHR$(Ø);
15 DQ=Ø:IFPC(D)=8THENGOSUB3Ø2ELS
EIFPC(D)=13THENGOSUB3Ø4ELSEIFPC(
D)=16THENGOSUB3Ø6ELSEIFPC(D)=22T
HENGOSUB3Ø7
16 FORT=1TO9:PRINT#-2,CHR$(27);C
HR$(16);CHR$(DQ);CHR$(DP);:FORQ=
1TOLEN(A$(D)):FORY=1TO6
17 IFA$(D)=""THENFORI=1TO11:PRIN
T#-2:NEXTI:GOTO23
18 IFA$(D)=CHR$(95)ANDCT=1THEN28
ELSEIFA$(D)=CHR$(95)ANDCT=ØTHEN2
4
19 V=ASC(MID$(A$(D),Q,1))-32:IF
V=Ø THEN PRINT#-2,CHR$(32);:GOTO
21
2Ø PRINT#-2,CHR$(A(L(V,T),Y));
21 NEXTY:NEXTQ
22 PRINT#-2:NEXTT:PRINT#-2:PRINT
#-2
23 NEXTD:FORT=1TO9:PRINT#-2:NEXT
:CLS:FORT=1TO1Ø:SOUND18Ø,1:NEXTT
:IFCT=1THEN28ELSE24
24 CLS:LOCATE5,3:ATTR3,2:PRINT"Y
OU HAVE THE FOLLOWING OPTIONS";:
ATTR1,Ø:LOCATE38,Ø
25 LOCATE9,8:ATTRØ,Ø:PRINT"1. PR
INT ANOTHER COPY":LOCATE9,1Ø:PRI
NT"2. START A NEW POSTER":LOCATE
9,12:PRINT"3. QUIT":LOCATE9,16:A
TTR3,2,B:PRINT"PRESS NUMBER DESI
RED";:ATTR1,Ø:LOCATE38,16
26 ATTRØ,Ø:P$=INKEY$:IFP$=""THEN
26ELSEP=INSTR(1,"123",P$):CLS:IF
P=1THEN3ELSEIFP=2THEN27ELSEIFP=3
THENWIDTH32:ENDELSE26
27 FORT=1TO11:FORM=1TO11:A$(M)="
":B$(M)="":NEXTM:GOTO256
28 WIDTH32:PRINT@33,"YOU HAVE TH
E FOLLOWING OPTIONS":PRINT@64,ST
```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```
RING$(32,42);:PRINT@165,"1. PRIN
T ANOTHER COPY":PRINT@229,"2. ST
ART A NEW POSTER":PRINT@293,"3.
QUIT"
29 P$=INKEY$:IFP$=""THEN29ELSEP=
INSTR(1,"123",P$):CLS:IFP=1THEN9
ELSEIFP=2THEN3ØELSEIFP=3THENENDE
LSEEND
3Ø FORM=1TO11:A$(M)="":B$(M)="":
NEXTM:GOTO273
1ØØ ' Graphics blocks data
1Ø1 DATA 252,239,239,239,254,224
,236,239,239,239,254,224,239,224
,224,224,239,224,253,239,239,239
,251,224,224,224,224,253,239,224
,239,251,224,224,224,224,239,239
,239,239,239,224,234,233,224,224
,239,224
1Ø2 DATA 239,239,239,224,224,224
,239,224,224,239,239,224,224,224
,224,224,224,224,224,224,239,224
,224,224,238,239,239,239,251,224
,239,224,224,224,224,224,224,224
,224,224,239,224,254,224,224,224
,239,224
1Ø3 DATA 234,239,239,239,239,224
,239,224,224,252,239,224,239,224
,252,251,224,224,239,252,251,224
,224,224,239,239,254,224,224,224
,239,224,253,254,224,224,239,224
,224,253,254,224,239,254,224,252
,239,224
1Ø4 DATA 239,253,239,251,239,224
,239,224,239,224,239,224,239,254
,224,224,239,224,239,253,254,224
,239,224,239,224,253,254,239,224
,239,224,224,253,239,224,239,239
,239,239,251,224,224,224,224,224
,253,254
1Ø5 DATA 253,239,239,239,239,224
,253,239,239,239,254,224,253,254
,224,252,251,224,224,253,239,251
,224,224,239,254,239,252,239,224
,224,252,239,254,224,224,252,251
,224,253,254,224,224,224,224,252
,251,224
1Ø6 DATA 224,224,252,251,224,224
,224,252,251,224,224,224,252,251
,224,224,224,224,224,252,239,239,239
,239,224,239,239,239,239,254,224
,224,224,252,239,239,224,224,239
,239,239,224,224,224,239,239,224
,224,224
1Ø7 DATA 252,251,253,254,224,224
,239,252,239,239,254,224,239,251
,224,224,239,224,239,251,239,224
,239,224,239,232,232,232,232,224
,231,231,231,231,239,224,252,239
,239,254,239,224,239,224,224,239
,239,224
1Ø8 DATA 253,239,239,251,239,224
,224,224,224,253,254,224,239,232
,232,232,239,224,239,231,231,231
,231,224,224,239,224,224,252,224
,224,253,239,239,251,224,224,239
,224,224,224,224,239,224,239,252
,239,224
1Ø9 DATA 224,224,224,239,224,224
,254,224,224,239,224,224,253,239
,239,251,224,224,224,239,224,239
,224,224,239,224,239,224,224,224
,224,224,239,224,239,224,235,236
,224,224,252,224,237,238,224,252
,251,224
11Ø DATA 252,251,224,235,236,224
,251,224,224,237,238,224,239,224
,224,252,253,224,224,224,252,239
,224,224,224,224,253,239,224,224
,224,253,254,224,224,224,224,239
,254,224,224,224,224,224,253,254
,224,224
111 DATA 224,239,251,224,224,224
,253,254,239,252,251,224,252,251
,239,253,254,224,224,224,224,224
,252,224,251,224,224,224,224,224
,252,239,239,239,251,224,239,224
,224,239,224,224,239,224,252,239
,239,224
112 DATA 239,224,253,239,251,224
,253,254,224,224,224,224,251,224
,224,252,251,224,251,224,239,224
,253,224,254,224,224,224,252,224
,251,224,224,224,253,224,239,251
,224,253,239,224,239,252,239,254
,239,224,254,224,224,224,224,224
,224,224,224,224,253,224
15Ø ' Characters data
151 DATA 12,12,12,12,12,11,12,11
,11
152 DATA 68,68,68,11,11,11,11,11
,11
153 DATA 68,68,7,68,7,68,68,11,1
1
154 DATA 12,1,69,34,7Ø,4,12,11,1
1
155 DATA 11,71,72,41,42,73,74,11
,11
156 DATA 38,68,36,38,39,75,67,11
,11
157 DATA 63,43,11,11,11,11,11,11
,11
158 DATA 76,42,63,63,63,78,77,11
,11
159 DATA 79,8Ø,65,65,65,41,81,11
,11
16Ø DATA 11,11,11,82,36,38,83,11
,11
161 DATA 11,11,12,12,7,12,12,11,
```

```
11
162 DATA 11,11,11,11,11,11,63,43
,11
163 DATA 11,11,11,11,7,11,11,11,
11
164 DATA 11,11,11,11,11,11,63,11
,11
165 DATA 11,84,4Ø,41,42,43,85,11
,11
166 DATA 1,3,3,3,3,3,4,11,11
167 DATA 48,12,12,12,12,12,47,11
,11
168 DATA 1,15,15,86,14,14,7,11,1
1
169 DATA 1,15,15,17,15,15,4,11,1
1
17Ø DATA 87,87,87,33,65,65,65,11
,11
171 DATA 7,14,14,34,15,15,4,11,1
1
172 DATA 1,14,14,45,3,3,4,11,11
173 DATA 7,4Ø,41,42,43,14,14,11,
11
174 DATA 1,3,3,7,3,3,4,11,11
175 DATA 1,3,3,33,15,15,4,11,11
176 DATA 11,11,11,12,11,11,12,11
,11
177 DATA 11,11,11,12,11,11,12,42
,11
178 DATA 4Ø,41,42,63,78,8Ø,58,11
,11
179 DATA 11,11,11,7,11,11,7,11,1
1
18Ø DATA 78,8Ø,58,15,4Ø,41,42,11
,11
181 DATA 1,3,91,41,12,11,12,11,1
1
182 DATA 1,3,88,26,89,9Ø,36,11,1
1
183 DATA 1,3,3,7,3,3,3,11,11
184 DATA 2,8,8,17,8,8,13,11,11
185 DATA 1,3,14,14,14,3,4,11,11
186 DATA 2,8,8,8,8,8,13,11,11
187 DATA 1,3,14,9,14,3,4,11,11
188 DATA 1,3,14,9,14,14,14,11,11
189 DATA 1,3,14,14,1Ø,3,4,11,11
19Ø DATA 3,3,3,7,3,3,3,11,11
191 DATA 47,12,12,12,12,12,47,11
,11
192 DATA 5,15,15,15,16,3,4,11,11
193 DATA 18,19,2Ø,21,22,23,3,11,
11
194 DATA 6,14,14,14,14,3,4,11,11
195 DATA 93,24,25,26,3,3,3,11,11
196 DATA 3,27,28,29,3Ø,3,3,11,11
197 DATA 1,3,3,3,3,3,4,11,11
```


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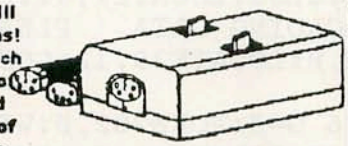

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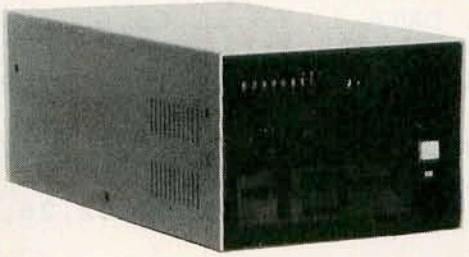

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```
198 DATA 1,3,3,31,14,14,14,11,11
199 DATA 1,3,3,3,3,29,33,32,11
2ØØ DATA 1,3,3,31,22,23,3,11,11
2Ø1 DATA 1,14,14,34,15,15,4,11,1
1
2Ø2 DATA 7,12,12,12,12,12,12,11,
11
2Ø3 DATA 3,3,3,3,3,3,4,11,11
2Ø4 DATA 3,3,3,3,3,35,36,11,11
2Ø5 DATA 3,3,3,26,96,95,94,11,11
2Ø6 DATA 3,35,36,12,38,39,3,11,1
1
2Ø7 DATA 93,35,36,12,12,12,12,11
,11
2Ø8 DATA 7,4Ø,41,42,43,14,7,11,1
1
2Ø9 DATA 47,63,63,63,63,63,47,11
,11
21Ø DATA 11,97,9Ø,78,8Ø,58,98,11
,11
211 DATA 47,65,65,65,65,65,47,11
,11
212 DATA 38,83,92,12,12,12,12,11
,11
213 DATA Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø
214 DATA Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø
215 DATA 11,11,11,58,55,56,57,11
,11
216 DATA 14,14,14,45,3,3,4,11,11
217 DATA 11,11,11,1,14,14,4,11,1
1
218 DATA 15,15,15,44,3,3,4,11,11
219 DATA 11,11,11,1,59,6Ø,4,11,1
1
22Ø DATA 46,12,12,47,12,12,12,11
,11
221 DATA 11,11,11,1,3,3,33,15,4
222 DATA 14,14,14,5Ø,51,3,3,11,1
1
223 DATA 11,12,11,48,12,12,47,11
,11
224 DATA 11,65,11,65,65,65,65,66
,67
225 DATA 14,14,18,19,9,22,23,11,
11
226 DATA 48,12,12,12,12,12,47,11
,11
227 DATA 11,11,11,5Ø,52,26,26,11
,11
228 DATA 11,11,11,5Ø,51,3,3,11,1
1
229 DATA 11,11,11,1,3,3,4,11,11
23Ø DATA 11,11,11,1,3,3,31,14,14
231 DATA 11,11,11,1,3,3,33,15,15
232 DATA 11,11,11,5Ø,51,14,14,11
,11
233 DATA 11,11,11,1,53,54,4,11,1
1
234 DATA 63,63,63,9,63,61,62,11,
11
235 DATA 11,11,11,3,3,18,57,11,1
1
236 DATA 11,11,11,3,3,35,36,11,1
1
237 DATA 11,11,11,26,26,64,57,11
,11
238 DATA 11,11,11,35,36,38,39,11
,11
239 DATA 11,11,11,3,3,18,57,15,6
2
24Ø DATA 11,11,11,31,41,42,44,11
,11
25Ø CLS3:PRINT@Ø," BULLETIN BOAR
D POSTER PRINTER":PRINT@32,STRIN
G$(32,42);:PRINT@1Ø2,"FOR COLOR
COMPUTERS";:PRINT@134,"   I - II
 - III    ";:PRINT@166,"AND DMP-
13Ø PRINTER";:PRINT@229,"BY: GEO
RGE QUELLHORST";
251 PRINT@288,"INDICATE WHICH CO
MPUTER YOU HAVE":PRINT@325,"  PR
ESS <1> <2> <3>  ":PRINT@384,"IF
 YOUR MACHINE DOES NOT OPERATE";
:PRINT@416,"WITH THE SPEED-UP PO
KE,(65495,Ø)":PRINT@455,"YOU MUS
T PRESS <1>"
252 P$=INKEY$:IFP$=""THEN252ELSE
IFP$="1"THENCLS:GOTO253ELSEIFP$=
"2"THENCLS:GOTO254ELSEIFP$="3"TH
ENCLS:GOTO255ELSE252
253 PRINT@259,"LOADING DATA  PLE
ASE WAIT":GOSUB279:GOTO273
254 POKE65495,Ø:PRINT@259,"LOADI
NG DATA  PLEASE WAIT":GOSUB279:G
OTO273
255 POKE65497,Ø:WIDTH4Ø:PALETTER
GB:CLS1:LOCATE7,12:ATTRØ,Ø:PRINT
"LOADING DATA   PLEASE WAIT":ATT
R1,Ø:LOCATE38,12:GOSUB279:GOTO25
6
256 G=Ø:POKE282,Ø:WIDTH8Ø:PALETT
ERGB:PALETTE1,Ø:CLS2:LOCATE11,Ø:
ATTR3,2:PRINT"S E L F   C E N T
 E R I N G   P O S T E R   P R
 I N T E R";:ATTR2,1:LOCATE78,Ø:
ATTR3,1
257 FORF=2TO12STEP2:G=G+1:LOCATE
5,F:PRINTG;:H=G+6:IFH=12THEN258E
LSELOCATE4Ø,F:PRINTH:NEXTF
258 LOCATE3,15:ATTR3,2:PRINT"
Input the amount of characters f
or line number one and press ENT
ER.    ";:ATTR3,1
259 LOCATE3,16:ATTR3,2:PRINT"The
 following line lengths are avai
lable: < 8 > - < 13 > - < 16 > -
 < 22 >";:ATTR3,1
26Ø LOCATE3,17:ATTR3,2:PRINT"You
```

```
 must stay within the [brackets
]. Press ENTER before the last b
racket.";:ATTR3,1
261 LOCATE8,19:ATTR3,3:PRINT"Pre
ss ENTER immediatly after the me
ssage to center your message.";:
ATTR3,1
262 LOCATE8,2Ø:ATTR3,3:PRINT"
Press ENTER just before the last
 bracket to left justify.    ";:
ATTR3,1
263 LOCATE1Ø,22:ATTR3,2:PRINT"EN
TER ANY LINE LENGTH AND PRESS EN
TER-ENTER FOR AN EMPTY LINE.";:A
TTR3,1
264 LOCATE1Ø,23:ATTR3,2:PRINT"
 ENTER ANY LINE LENGHT AND SHIFT
/UP - ENTER TO QUIT INPUT   ";:A
TTR3,1
265 ATTR3,1:G=1:B=9:C=13:FORF=2T
O12STEP2:GOTO267
266 G=7:FORF=2TO12STEP2
267 LOCATEB,F:LINEINPUT"";B$(G):
IFG<6THENLOCATE4Ø,F:IFG+6<12THEN
PRINTG+6
268 A=VAL(B$(G)):IFA<>8 ANDA<>13
 ANDA<>16 ANDA<>22 THENLOCATEB,F
:PRINTSTRING$(25,32);:GOTO267
269 A=A+C:LOCATEA,F:PRINT"]";:LO
CATEB+2,F:PRINT"[";:LINEINPUT"";
A$(G):IFA$(G)=CHR$(95)THEN272ELS
ELOCATEA,F:PRINT"]":IFG+6<12THEN
LOCATE4Ø,F:PRINTG+6
27Ø G=G+1:IFG=12THEN272ELSENEXTF
271 B=B+35:C=48:GOTO266
272 PALETTERGB:WIDTH4Ø:CLS1:ATTR
Ø,Ø:POKE282,255:POKE65496,Ø:GOTO
3
273 CLS:POKE282,Ø:PRINT@1,"SELF
CENTERING POSTER PRINTER":PRINT@
32,STRING$(32,42);
274 S=96:FORF=1TO11:PRINT@S,F:S=
S+32:NEXTF:PRINT@481,"LINE WIDTH
S ARE: [8-13-16-22]";:S=1ØØ:FORF
=1TO11
275 PRINT@S,"";:LINEINPUT"";B$(F
):A=VAL(B$(F)):IFA<>8ANDA<>13AND
A<>16ANDA<>22THENPRINT@S,STRING$
(25,32):GOTO275ELSEPRINT@S+2,"["
276 A=(A+S+4):PRINT@A,"]";:PRINT
@S+3,"";:LINEINPUT"";A$(F):IFA$(
F)=CHR$(95)THEN278ELSEPRINT@A,"]
"
277 S=S+32:NEXTF
278 POKE282,255:POKE65494,Ø:CT=1
:GOTO9
279 FORX=1TO98:FORY=1TO6:READ A(
X,Y):NEXT:NEXT:FORX=1TO9Ø:FORY=1
TO9:READL(X,Y):NEXT:NEXT:RETURN
3ØØ 'Printer codes gosubs
3Ø1 PRINT#-2,CHR$(27);CHR$(29);C
HR$(27);CHR$(14);:DP=INT((576-(L
C(D)*72))/2):RETURN' 8 Character
s double strike.
3Ø2 PRINT#-2,CHR$(27);CHR$(23);C
HR$(27);CHR$(14);:DP=INT((576-(L
C(D)*72))/2):RETURN' 8 Character
s single strike
3Ø3 PRINT#-2,CHR$(27);CHR$(18);:
DP=INT((48Ø-(LC(D)*36))/2):RETUR
N' 13 Double st.
3Ø4 PRINT#-2,CHR$(27);CHR$(19);:
DP=INT((48Ø-(LC(D)*36))/2):RETUR
N' 13 Single st.
3Ø5 PRINT#-2,CHR$(27);CHR$(29);:
DP=INT((576-(LC(D)*36))/2):IFDP>
255THENDQ=1:DP=DP-255:RETURNELSE
RETURN' 16 Double str.
3Ø6 PRINT#-2,CHR$(27);CHR$(23);:
DP=INT((576-(LC(D)*36))/2):IFDP>
255THENDQ=1:DP=DP-255:RETURNELSE
RETURN'16 Single st.
3Ø7 PRINT#-2,CHR$(27);CHR$(23);C
HR$(27);CHR$(2Ø);:DP=INT((96Ø-(L
C(D)*42))/2):IFDP>255THENDQ=1:DP
=DP-255:RETURNELSERETURN
```


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Software CoCo 3

Laser Surgeon: The Microscopic Mission — The Cutting Edge

"Cardiac arrest, doctor!"

"Bicarb! EPI! Defibrillate — 20 watt/seconds! Joystick!"

"Joystick?"

Absolutely! Pass the joystick, open your mind, and prepare to think, learn, and be entertained at a furious pace. As a cardiovascular physiologist, I always knew that medicine and anatomy were fun. There were a few problems, however, in convincing anyone else that this was, indeed, the case. With the programming wizardry of Mark Easter and Greg Zumwalt, and the medical expertise of Robert Clardy and Alan Zalta, M.D., *Microscopic Mission* should go a long way toward changing this perception. The CoCo 3 is making a house call.

Bearing in mind that one is working within the limitations of a computer-simulated environment, *Microscopic Mission* proceeds with a startling aura of reality. Each player begins his "rotation" as a medical trainee sorely in need of polishing his or her medical skills. In view of this fact, the program assigns cases based on the recorded skill level of each player, a strategy that encourages inquisitive would-be doctors to continue to play, sharpening their skills even further. As these skills are dependent on real-life medical knowledge, including anatomy, physiology, etiology (the study of the causes and origins of illness) and the treatment of human disease, the potential for learning is truly phenomenal.

The game begins with the assignment of a life-threatening case (patient) requiring successful microsurgical treatment within a specified period of time. Pertinent facts about the patient are displayed on a replica of a hospital chart. Details about the injury, lifestyle (smoker/non-smoker, alcohol use), allergies to medications and any other medical information vital to the case are contained on the patient's chart.

"Doctors" would be well-advised to follow the suggestions provided in the documentation and take adequate notes about their particular case before proceeding. Once the game starts, you cannot return to this screen and all its vital information until the patient either dies or is successfully treated.

Actual play begins with the injection of a microscopic probe into the patient's common iliac vein. All you old-timers out there may note that this Simulation is very similar to the movie *Fantastic Voyage* (*sans* Raquel Welch).

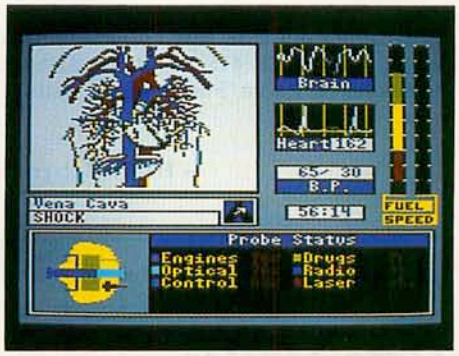
The probe is a well-equipped but rather fragile craft. Sensors detect and display the heart rate, blood pressure, and EKG of the patient on a continuous basis. A visual monitor is your view into this internal world, while other gauges and indicators display power status, laser condition, drug supplies, and other vital information.

Your task is a simple one: Pilot the craft through the venous system, through the right side of the heart, through the lungs (where you cross over to the arterial side of the circulatory system), back through the left side of the heart and up to the brain, where you finally perform your surgery!

Along the way you have to deal with invading bacteria, viruses, and the body's own immune system. The craft is a foreign body, and the patient's body will try to reject it, especially if he or she has been ill recently (remember to read the chart and take notes). Each of these attempts at rejection causes damage to the craft, which can result in partial loss of visual reception, loss of drugs stores, and damage either to the engines (reducing speed) or to the control system (reducing the craft's maneuverability). Eventually, encounters with these hostile forces will cause the outright destruction of the ship, the death of the patient, and the end of the game.

But medicine is based on knowledge and hope! And *Microscopic Mission* provides the player with both of these essential tools. There is an on-board library that can readily identify and explain the proper uses of the various tools, drugs, and instruments necessary to treat all the medical emergencies you will encounter. Whenever an invading microorganism is targeted within the laser sight, a press of the F1 key will prompt the ship's onboard library for more detailed information. Sequential screens detail the organism, describing where it originated, what diseases it can cause, and the proper treatment. The organisms are quite real, and the recommended treatments are medically accurate.

Points are awarded for correctly identifying an invading microorganism and dispensing the appropriate prescription. However, the reverse is also true. Failure to correctly diagnose a disease (or to successfully treat a physical problem such as an irregular heart beat) results in the loss of points. Indeed, the first game I played resulted in an ego-shattering score of -2,000. Fortunately, the cumulative score log does not recognize values less than zero. Whew!



As the ship cruises through the various arteries and veins, the view constantly changes; erythrocytes (red blood cells) are numerous and constantly stream by the craft, as do the less numerous basophils, eosinophils, lymphocytes, etc. Even occasional immune globulins are seen! Throw in a spirochete or two, some *yersinia pestis* . . .

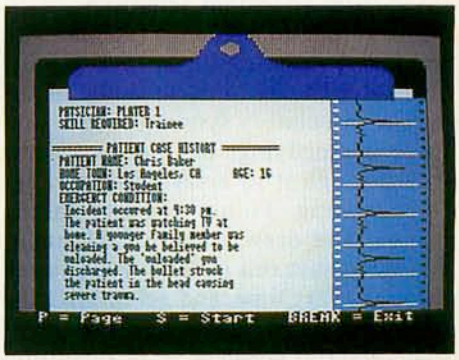
The anatomy lesson is equally impressive, replete with animated valvular leaflets in both ventricles of the heart. Also, atherosclerotic plaque abounds (hardening of the arteries). Incidentally, you can perform a real service for your patient by blasting those little grease spots with your laser (points never offend someone who once scored -2,000!).

By now you get the idea — the terminology is imposing. Those last paragraphs are but a sample of the treasures that have been planted within this program. I prefer to think of any learning experience in positive terms, but exposure to medical terminology may truly be a death sentence to some. If the terms that were thrown around so liberally a few sentences ago are a turn-off, I suspect that *Microscopic Mission* will be a disappointment for you. Be forewarned, and factor this into any purchase decision.

While we're on the subject of medical terminology and personal preferences, the matter of what age group would benefit from exposure to *Microscopic Mission* becomes quite important. While the terminology is certainly at the high school level and beyond, there is at least one other consideration that many parents will want to know about. I've witnessed far too many people express offense when sexual information — no matter how it is displayed, or how important the message (consider AIDS) — is discussed. On your travels through the body, you will encounter noxious, sexually transmitted gremlins such as neisseria gonorrhea and treponema palladium. The library accurately identifies these organisms as sexually transmitted, and offers advice on their treatment and avoidance. You have already been exposed to some of this terminology. A few paragraphs ago, the term *spirochete* was used. If you didn't recognize *that* clue . . .

Microscopic Mission breaks the mold in several other respects, not the least of which is the implementation of the CoCo 3 and OS-9 Level II. No toy business here, not at all! (Hello, Fort Worth, are you listening?)

This program was initially written for MS-DOS computers and ported over to the CoCo via OS-9 Level II. As I own an MS-DOS engine, as well as a 512K CoCo 3, I purchased both the MS-DOS and CoCo 3 versions of *Microscopic Mission* and ran them side by side. Both of these computers (and their operating systems) have their respective strengths and weaknesses.



MS-DOS machines are simply horrid at animation. Much of this is due to the fact that programmers insist on writing for the lowest common denominator in MS-DOS graphics, which is a standard called CGA (a resolution comparable to the CoCo 3 with an RGB monitor). But the MS-DOS machines have no provision for decent sound. Indeed, the cardiac arrest alarm in *Microscopic Mission* sounds like a mouse with a bad cold — hilarious, not alarming, and quite distracting.

Games are also speed-dependent, and

even with the processor set to 8 MHz, *Microscopic Mission* lagged terribly. Compared to the OS-9, Level II version, the MS-DOS version played in *slow*, disappointing motion. The documentation is the same for both versions, and aside from sound and speed differences, it was impossible to tell which version was which merely by looking at the monitors.

These variations highlight the subtle differences that go into a great program. While I would give the OS-9 version a 9.8 out of 10, the MS-DOS program would rate a "do not buy," in spite of the program's obvious merit.

A rating of 9.8 is hallowed ground, but some aspects of the program are a bit cumbersome. *Microscopic Mission* is active, at times too much so. I often found myself working the joystick (not required, but *highly* recommended), banging the < and > keys (to change direction), dispensing a drug (press D), and stopping the screen to prescribe a lifestyle change, *all at once.*

The CoCo 3 is an impressive machine, but it can handle only one input at a time. This leads to commands stacking up or getting lost, and the operator getting confused. Take it slow and easy until you become comfortable with the controls and their limitations. And one other tip — if you score in the negative range (or zero, as the cumulative scorekeeper sees it), just exit the game and restart the program. By doing this, a hard-fought skill rating can be saved from an instant demotion.

In addition to becoming familiar with medical terminology, the operator must also solve the anatomical riddle of the human circulatory system. Once is fun, twice is satisfying, but puzzling your way through it in every game can become a drag. Follow the tips in the manual and draw a map of the lungs. Once you have this in hand, you can sail through every time, and get on with the show. Everyone is allowed one oversight, and this needless, static repetition of the same maze is a major flaw, but one that can easily be overcome.

Microscopic Mission is supplied on a single flippy disk. The OS-9 Level II boot routine is on Side 1, as is the game initialization scheme. Follow the prompts, flip the disk over, and the game executes from the second (flip) side of the distribution disk. Interestingly, Side 1 may be backed up by the conventional BACKUP command, but Side 2 is apparently copy-protected.

Minimum system requirements are a 128K CoCo 3 (512K optional) and a single disk drive. The use of an RGB monitor is a must, as the visual displays are extraordinary. The optional joystick is also a virtual requirement; there is simply too much keyboard *work* involved without it. The documentation is supplied as a bound 30-page manual, and is on par with the overall quality of the program (OS-9 version). A little perseverance, some luck and a steady hand are your keys to a memorable experience. The life you save may be your own.

(Activision, Inc., P.O. Box 7287, Mountain View, CA 94039, 415-960-0518; $29.95. Available in Radio Shack stores nationwide.)

— Henry Holzgrefe

Software CoCo 3

Data Master — Friendly OS-9 Filer

One of the major reasons given for the purchase of a computer is the organization of information. Usually, the new owner wants to organize a music or video tape collection, a stamp/coin collection, recipes, etc. There are specialized programs for such needs (some have appeared in THE RAINBOW), but there is nothing like a good generic database management system that can handle a variety of information applications.

Computerware's *Data Master* is such a program. Running on the CoCo 3 under OS-9 Level II, *Data Master* is a much friendlier version of two of its previous incarnations. Some years ago, Computerware published a program called *Data Bank*. Shortly after its publication, Tandy licensed the program from Computerware and renamed it *OS-9 Profile*. *Data Master* is fundamentally the same as *OS-9 Profile* in terms of overall capability, but is easier to use due to the windowing capability of OS-9 and the CoCo 3.

I have been using *OS-9 Profile* for a number of years and was pleased to see this update, although I still have some complaints. Fortunately, there is complete compatibility among the three programs. By the way, there is an upgrade option for those who have either *Profile* or *Data Bank* and want to obtain *DM*.

After copying *Data Master* into the CMDS directory, you boot the program by typing dm. A startup file is provided but is not necessary if your system sets up a standard 80-column text window. Once *DM* has booted, the screen resembles a typical MS-DOS database screen. The top line of the screen is a menu bar from which pop-down menus appear at the press of certain keys. Within the menu bar are the following options: Desk, File, Work, Output, Edit, and Template. Access to these options from the menu bar are accomplished by typing the slash (/) key followed by 'D', 'F', 'W' or 'T'. The slash key always brings up the last selected pop-down menu. Selecting an item from the menu bar summons a dialog box, which acts as a submenu or requests further information of the user.

The menu bar provides access to all the major tools needed to set up and use a database. The Desk option provides the capability to change or view a directory, invoke a shell, set auto update, and change the printer path and monitor type. The File option takes care of opening, closing, renaming, deleting, and backing up files. In addition, there are options to save data in a *DynaCalc* spreadsheet format as well as load data from a spreadsheet. When starting a new database, you choose the Open option and tell *DM* the new filename.

After you have opened a new file, you must design the record structure, i.e., the number and type of fields that comprise a record. For example, I maintain a database of public domain software, a simple file containing the program's name, type, disk number, source, and a brief description.

Using the Edit option from the menu bar, you can add, modify, delete, and view the fields in the database as well as view the entire record structure.

When the record format is complete, the next step is to set up screen, access and report formats from the Templates menu. *DM* maintains up to nine screen, access and report formats that can be selected through the dialog boxes at any time. A use of the screen format may be to design various screens for data display. Designing these screens is very easy using the arrow keys to add descriptive information to the screen format. With the report formats, the user has control of the layout — margins, line width and lines per page — and can even send printer codes to the printer. The access formats allow you to sort the database up to three fields deep for each format. In my public domain program database, I have an index

sorted by disk number and program name, another by program type and disk number, and still another by just a program's name.

The Ouput menu allows you to examine all the records or a specific selection in the database using the current access method. Records can be displayed on the screen according to the current screen template, or they can be presented in spreadsheet style (one record per line). I like the spreadsheet option, as you can review a lot of data easily.

The documentation provided with *Data Master* consists of a 42-page manual, which gives a clear and concise description of all aspects of the program. The manual also contains an appendix that provides a tutorial using a file provided on disk. Another appendix gives technical information on *Data Master* files and on accessing them from BASIC09.

I have two problems with *Data Master*. The first is that field lengths cannot exceed 64 characters, and the second concerns report formatting. A maximum of five printed lines is alloted per record, which I find rather limiting. These two limitations probably won't affect most users in average use, but can be problems for larger application. In any case, I do strongly recommend *Data Master* as a good generic database manager that is easy to use and provides a lot of capability. The frosting on the cake is that *Data Master* maintains downward compatibility with *OS-9 Profile* and *Data Bank*.

(Computerware, 4403 Manchester Ave., Suite 102, Box 668, Encinitas, CA 92024, 619-436-3512; $64.95)

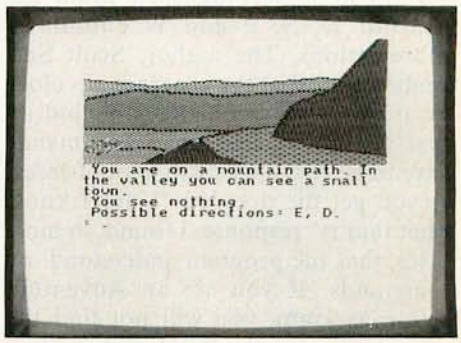
— Donald D. Dollberg

Software CoCo 1, 2 & 3

Tomb of T'ien — Adventure in the Far East

Tomb of T'ien is a graphics Adventure game set in the far eastern part of Asia. As in many graphics Adventures, this one uses the split-screen feature displaying the current surroundings on the top half of the screen and the text description and action prompt on the bottom.

The scenario casts you as an adventurer trying to recover treasure that was stolen from your village. You must find the sacred shrine and conquer the evil dragon before he burns your village again. You experience many obstacles during this trek and will frequently call on the great Guru for advice.



T'ien is written for a 64K Color Computer with Extended Color BASIC, but runs on the CoCo 3, as well. It is available on either disk or tape. If you have the CM-8 RGB monitor connected, you will get a black-and-white picture. If you use a TV set or color composite monitor, you will see the Adventure in full color. The program is copy-protected, but a procedure is

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provided to a make a non-executable backup that can be used to restore the original if necessary. If trouble persists, the company will send you another copy free of charge.

The Adventure is challenging and incorporates many scenes and objects for you to GET, EXAMINE and DROP. Movement is accomplished using the familiar N, S, E and W command abbreviations. The author, Scott Settembre, says that the program has close to a 200-word vocabulary including over 100 nouns. That means commands have to be very specific in a lot of cases, or you get the dreaded "I don't know what that is" response. I found, in most cases, that the program understood my commands. If you are an Adventure junkie as I am, you will not find the commands unusual. Besides, an Adventure with a smaller vocabulary is very challenging to communicate with.

Tomb of T'ien is not a snap to solve. I spent many hours playing with it for this review and finally sneaked a peek at the solution the author provided before I was able to complete the Adventure. (Don't look for the solution if you purchase *T'ien*, because it's not part of the package.) Like anything challenging, you will do your best if you solve the Adventure a step at a time and keep a map of your progress. You can save your work on disk and pick up where you left off, so there's no need to try to solve it in one sitting.

Tomb of T'ien is an exciting Adventure with good graphics. I'd like to see a CoCo 3-specific version that could take advantage of the machine's enhanced graphics.

(Valkyrie Sofware, P.O. Box 2120, Monroe, NY 10950, 914-783-0191; $19.95 plus $2 S/H)

— Jerry Semones

Software CoCo 1, 2 & 3

Lot-Pro — CoCo Helps You Pick Six

To win the lottery in my state, you must pick six numbers out of 40, and those six must match the numbers that the Lotto machine picks. In choosing these numbers, some people use their birthdays or social security numbers, or they just play a hunch. Not very scientific. After looking into the situation, I wondered if my Color Computer could assist me in choosing winning Lotto numbers in a more logical manner.

Evidently Carl Nicita also thought computerized forecasting of lottery numbers has merit because he has released a program titled *Lot-Pro* to assist owners of Tandy Color Computers in becoming millionaires.

The principle of the program seems to be that although the "Magical Lottery Number Picker" is supposed to generate totally random numbers, there might be a repeating pattern that can be analyzed to determine what numbers will be most likely to appear in the future. Sounds logical enough, doesn't it? Let's take a closer look at the process.

First, you have to do some homework and get a list of numbers that have hit during the past 15 games for the lottery you want to analyze. You can get this list from your State Lotto Office.

Next, you enter the amount of numbers used in the lottery game, and the computer asks you a series of questions about how often this number has been a winner and the sequences in which these numbers have won. Your CoCo crunches this data and gives you a list of the hottest numbers down to the duds.

Lot-Pro gives you the option of using a wheeling system to add your favorite lucky number to these "hot numbers" to generate strings of six numbers.

By analyzing this printout and placing appropriate bets on these combinations, your odds of picking a winner can be greatly increased, or so the documentation implies.

Operation of *Lot-Pro* is easy. Screen prompts assist the user in the steps necessary to generate a printout. The program is also well-documented with a five-page instruction manual that describes how to operate the program, how it optimizes your chances of winning and how to analyze previous winning numbers to generate your data.

Does the program work? Well, the program runs, and it generates the series of numbers as promised. Does it produce winners? There was only one sure way to find out, by betting hard cash.

Here's how I did. Of the six numbers picked by the program, I hit two out of six. No bucks, but not bad. Realizing that a single bet would not prove or disprove the system, I also placed imaginary bets on the 41 other combinations that were generated by the wheeling system.

The results of these 41 bets were:

0 hits	13
1 hit	19
2 hits	6
3 hits	3
4 hits	0
5 hits	0
6 hits	0
	41 bets

These bets would have generated no winnings. Can you do better? I don't know. But you can easily find out by trying *Lot-Pro*.

(CJN Enterprises, P.O. Box 40487, Bakersfield, CA 93384, 805-836-1323; $25.95)

— Bruce Rothermel

Software CoCo 1, 2 & 3

The Astro Fortune Teller — Portents of Your Destiny

The Astro Fortune Teller is a machine language program written for the ECB Color Computer 1, 2 or 3. The author, R.J. Babich, Ph.D., is a sociologist and astrologer, and the program is based on his astrological principles.

If you run *The Astro Fortune Teller* on a CoCo 3 and the Tandy CM-8 RGB color monitor, the graphics title screen appears in black and white. This does not present a problem, however, as the title screen provides no useful function other than appearance (which is quite attractive). If this bothers you, you can always hook your CoCo 3 to a color TV set or use a composite color monitor.

The Astro Fortune Teller uses the standard 32-column screen to display questions and answers.

The program is supplied on a copy-protected disk, but the instruction sheet that comes with the software tells you how to make a non-executable backup copy to be used to restore the original disk if a problem arises. If the program develops a problem that cannot be fixed by a restoration, the company will send you another for $3 to cover postage and handling.

The Astro Fortune Teller fills up an entire disk. In checking for the amount of free memory left on disk (?FREE(0)),

I got a response of 0 — this is due to the many data files (astrological tables) that comprise the various answers to your questions.

There are 30 pre-written questions to select from. After loading the program, you are asked for the day of your birth, your first name, and the current day of the week. You can then page through the various screens of questions to select the one you would like the fortune teller to answer. Such questions as "What day of the week or month will be the most important to me?"; "Is my absent friend happy or in trouble?"; and "In what calling or business will I prosper?" are typical. I would prefer asking my own questions, but I am sure such a program would be difficult to write given the memory constraints of the CoCo 1 and 2. Besides, the questions available pretty much cover the waterfront in terms of their scope. I must admit that I was surprised that many of the answers were very descriptive of some of my own situations and lifestyle.

I found *The Astro Fortune Teller* to be fun and interesting, and probably typical of the kinds of responses one would expect from a real fortune teller. It's not the kind of program that really fills a need in one's business or personal life, but can be used as an entertainment device. Who am I, though, to question the all-wise *Astro Fortune Teller*? Maybe if I heeded his advice I wouldn't have to work for a living!

(The Saint John Gallery, P.O. Box 613, Mt. Sinai, NY 11766, 516-928-6991; $19.95 plus $1.75 S/H)

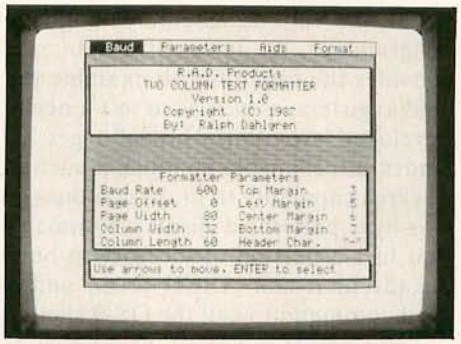
— David Gerald

Software CoCo 1, 2 & 3

Textform — Outputting Text in Two Columns

Have you ever needed to create a printout of a file in two columns? Or wanted to LLIST BASIC programs in double-column format? I need to do things like that all the time. For one of my physics classes, I like to print a set of instructions that can be folded into a small booklet.Programming for two-column text ouput required a lot of time and creativity — until now.

Textform from R.A.D. Products takes the work out of formatting text in two columns. The input text can be from any ASCII text file such as a BASIC program listing, word processor, or even a list. The author solves a programming problem in an elegant way.



Textform comes on a single, unprotected disk and includes three files. TEXTFORM.BIN is the main program and does all the work. FONT.BIN is, I presume, a font file for the screen display. DEFAULT.PRF contains default settings for formatting text output. *Textform* is very easy to use even though it has many options and is quite flexible. The user interface is similar to the Apple Macintosh interface.

Input to the program is accomplished by an option bar and pull-down menus, which can be accessed via the arrow keys, joystick, mouse, Hi-Res input pack or digitizer pad. The program works just fine from the keyboard; the rest of the options are handy for those who prefer other input devices. Giving the user a choice is a professional touch I'd like to see in more programs.

Printer rates from 600 to 9600 baud can be set using the menu bar option Baud; specifying the file to print is done within Format. The two remaining menu bar options are Parameters and Aids. Parameters contains settings that affect the final look of the document. There are inputs for left, right, center, top and bottom margins; page and column widths; page offset; column length; and header characters.

Some of the options I found to be redundant. For example, I don't see the need to specify the column length if the top and bottom margins, header and page length have been specified. In fact, if all the settings don't agree, some pretty odd output is produced. This is only a minor inconvenience, however.

The author discusses how to choose parameters in the instruction manual and even gives equations for calculating them. Once preferences have been set within Parameters, they can be stored for future use. Different preference files can be created for different jobs. This way, when the output looks good, you never have to remember how it was done. All you have to do is save the settings — another handy, professional feature.

The program also allows you to send printer codes directly to the printer. This is an essential feature if your printer requires special codes for different typefaces or type widths. This ability could have been coded into the program, but that would mean you would need a different version for each printer you use. I much prefer the manual approach; I've had a few oddball printers that refused to work with certain programs. That wouldn't be a problem with *Textform*.

Once the preferences are set, all that is left to do is select a file and answer a couple of questions. Then output begins. Before printing, word wrap can be turned on or off. Just after choosing the file to process, you are asked if you want to output to printer or a disk file. I wish more programs allowed this choice. With it, *Textform*'s flexibility is multiplied manifold. With a word processor you can "massage" the output from *Textform* any way you like. This allows boldfacing, underlining, etc., in two-column format. I really have a lot of uses for this option.

If *Textform* stopped here it would be worth buying, but it doesn't. If you enter "slash" commands (command lines preceded by /) in your text, you can modify the output as the text is processed. The slash commands allow you to control header line text, page numbering, word wrap and forced page ejection. The manual clearly shows how all of these are done, providing several examples.

This wouldn't be a review if I didn't have a complaint or two. I already mentioned the "overlapping" parameter settings above. They are easy enough to work around that I don't find them a real problem. The only other complaint I have is also a small one: I can't find a way to get a directory listing from within *Textform*. If I remember to look at a directory and write down filenames before I start, that isn't a problem. Unfortunately, I never seem to remember to do that. I also seem to be good at forgetting the exact name of a text or parameter file just before I need it. It would be really handy to be able to look at a directory listing without exiting *Textform*. I can live with the problem — it's just a nuisance.

My recommendation is clear. If you do much text processing, you probably need *Textform*. If you do any two-

column text processing, you definitely need *Textform*.

(R.A.D. Products, 194 Hotchkiss St., Jamestown, NY 14701, 716-665-2124; $34.95 plus $3 S/H)

— Donald L. McGarry

Software CoCo 3

OS-9 Development System — Completing the OS-9 Trilogy

When Tandy released the OS-9 Level II Operating System for the Color Computer 3, it soon became obvious that it was only a part — although a major part — of the full system. Careful review of the Tandy catalog revealed two additional packages: *Multi-Vue* and the *OS-9 Development System*. These three packages make up what I consider to be the complete OS-9 Operating System. Some users will run out and buy all three packages, while others will be content with the basic operating system. Although it is not possible to cover all the details of each item because of space limitations, I'll try to provide sufficient information so that you can determine your own needs.

First of all, the *Development System* is a package of programs for the advanced OS-9 user who programs in assembly language.

The *Development System* comes in a three-ring binder like the Level II package, with a "flippy" disk to accommodate all of the programs. These programs include an interactive debugger, screen editor, relocating macro assembler, several utilities to simplify assembly language programming, and 12 additional commands that were left out of the basic package but are familiar to all Level I users.

The interactive debugger is essentially the same as the Level I Debug command, so those familiar with the Level I version know what to expect. For the new user, a major function of Debug is to patch programs and other modules. For Level II, this can be accomplished using the ModPatch command, although Debug is more versatile because you can scan memory and look at specific memory addresses. Debug also contains a built-in calculator that displays results in both hexadecimal and decimal. The calculator mode is intended for quick calculations pertinent to the development of an assembly language program.

For the serious assembly language programmer, the interactive debugger provides the capability to examine the 6809 registers, as well as to test a newly developed program. The debugger includes miscellaneous commands such as a search capability to look for a one- or two-byte pattern, a display command that lists a portion of memory in both hexadecimal and ASCII form, and a shell command to call the OS-9 shell.

The Level II screen editor, known as Scred, is a screen-oriented text editor designed to prepare program text for the assembler or other high level languages. The major features of Scred include adjustable screen and workspace size; cursor positioning by characters, words and line; cut and paste; change, find and search strings; and wild cards. While Scred has most of the features of a good word processor and can be used for preparing typical text documents, it does not contain features such as word wrap and text formatting.

Scred has three modes of operation — Command, Edit and Insert. Command mode provides the capability for manipulating files such as load and save. Edit mode provides for text modification in the edit buffer, and the Insert mode allows direct insertion of new text. Scred comes with a file called TermSet, which allows for several different terminal types to use Scred. Support is provided for both the VDG screen (the 32-by-16 CoCo screen) and the standard windows, as well as the terminal types KT7, ANSI, ABM85 and ABM85H. The manual provides enough information for writing additional terminal types for unsupported terminals.

The relocatable macro assembler, the heart of the *Development System*, is unlike the assembler (ASM) provided in the Level I system. RMA allows the programmer to assemble sections of assembly language code independently. The assembled sections are referred to as relocatable object files (ROF). With the linkage editor (RLINK), any number of ROF's can be combined into a single, executable OS-9 module. The features of RMA include built-in functions for calling OS-9 system routines; position-independent, re-entrant code support; creation of standard subroutine libraries, which can be written separately and then linked together; conditional assembly and library source file support; and OS-9 modular, multitasking environment support.

RMA is a two-pass assembler. In the first pass through the source code, RMA creates the symbol table. During the second pass, RMA adds the machine language instructions and data into the relocatable object file.

Included with RMA is the all-important DEFS directory. Files included in this directory contain definitions of symbolic names for all system calls. The file OS9Defs.a provides definitions for all system functions under Level II. For programmers who might prefer to use the Level I ASM assembler, the DEFS directory contains the files DefsFile, DefsFile.dd, OS9Defs and SysType. These files contain Level II information in the correct format for ASM. Also included in DEFS are the files Wind.h, Mouse.h and Buffs.h, which contain data structures for window, menu, mouse and buffer manipulation using the C language. Still another file, Cgfx.l, provides Level II graphics routines for the C language.

Space does not permit an in-depth discussion of RMA and RLINK, but I would like to mention that RMA is not just for the advanced assembly language programmer. As everyone is aware, there are some very interesting utility programs published in THE RAINBOW and available on bulletin boards. Without RMA and the DEFS files, it would be impossible to obtain an executable module. This may be reason enough to consider the purchase of the *Development System*.

The modular concept of OS-9 makes program development much simpler, especially with tools like RMA. However, keeping track of the various modules and ensuring that you are working with the most current versions becomes somewhat difficult. Enter the Make and Touch utilities, which are standard UNIX tools used during program development to make sure all modules are up-to-date. Make also simplifies the process of recompiling the entire program when one module is updated.

Also included in the *Development System* is a virtual disk driver, commonly known as a RAM disk. A RAM disk is simply a part of memory formatted to operate as a standard disk drive, but at a much faster speed. RAM disks are useful when dealing with very disk-intensive operations, such as assembling or compiling programs, or for editing large text files. I find it partic-

ularly useful when downloading from bulletin boards.

To use the RAM disk, all you have to do is load the driver RAM and an appropriate r0 descriptor. The disk comes with three versions of r0: a 96K version, 128K version and a 192K version. The manual provides information on how to change the r0 descriptor for other memory sizes. Once RAM and r0 are loaded, all that is needed is to iniz r0, and the RAM disk is ready to go.

When the original Level II package was released, many people were disappointed that a number of Level I commands were not included. However, all of the missing commands are included in the *Development System*. The commands are Binex, Dump, Exbin, Login, Park, Save, TSmon, Tee and Verify.

Although most of these commands are not often used, I have had need for the Save, Dump and Verify commands and would have liked to have seen them included in the basic Level II package.

The *OS-9 Development System* is certainly a must for all assembly language programmers. Other users should weigh the cost versus the need for this capability. Overall, Tandy has provided an excellent package for program development with all the supporting tools needed for this endeavor.

(Tandy Corporation; $99.95. Available in Radio Shack stores nationwide.)

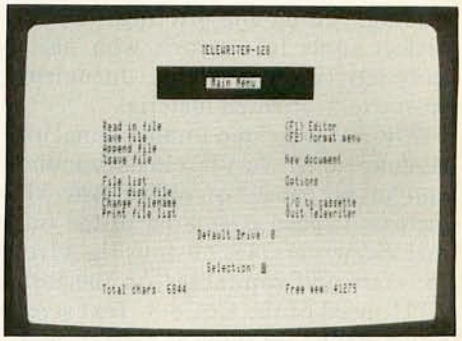
— Donald D. Dollberg

Software CoCo 3

Telewriter-128 — 80 Columns, Lightning Speed and New Power Enhance the "Old Standard"

In my opinion, the one program that has made the Color Computer the popular small computer that it is today is *Telewriter-64* from Cognitec. *TW-64* introduced thousands of us to the world of word processing and enabled us to use these inexpensive computers in new and imaginative ways.

Now Cognitec, in conjunction with Bob van der Poel, has released *Telewriter-128* for the CoCo 3. They have incorporated the best features of *Telewriter-64, Telepatch* and *Ultra-Telepatch* into this exciting version, while adding many new features and refinements.



The program is not copy-protected, so making backup copies for your own use is not a problem. The *Telewriter-128* disk contains the *TW-128* program, two short demo text files, and a conversion program, which lets you convert older *TW-64* BIN files to work on *TW-128*. Cognitec has discontinued the use of binary file storage in lieu of the universally accepted ASCII file saves.

For those of you not familiar with the

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Reviewed in RAINBOW, February 1988.

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term, *word processing* allows you to write and edit text on the screen of your computer monitor and print hard copies on your printer. You can then save the text to tape or disk for later recall or editing. Word processors are, in effect, electronic typewriters that can be used to compose any kind of text for reading, editing and printing. They are perfect tools for anyone who has to write letters, create forms, documents, or any text-oriented material.

TW-128 is written totally in machine language and is very fast in its execution and in all facets of operation. This increased speed compared to the original *Telewriter-64* is obvious right from the start and capitalizes on the faster CPU speed of the CoCo 3. Text scrolls faster, keyboard input is clearer, and I could find no evidence of keyboard delay or screen updating. *TW-64* used its own software-generated character set, while *Telewriter-128* accesses the CoCo 3's video circuitry directly. The result is an outstanding 80-column display on a monochrome or RGB monitor.

Getting Started

After executing the program, you are greeted with a colorful credit screen and then automatically switched to the main menu. Two of the options on this screen are Read, which allows you to load in a file from either disk or tape, and Save, for saving a file to disk or tape.

In the *TW-128* disk version, the Read command first displays the names of all ASCII text files on the default drive. You select which file you want to read in by using the arrow keys to move the highlighted cursor to the file of your choice and pressing ENTER.

If you are using cassette, a window is displayed that requests the filename of the file to read in. Cognitec provided a nice touch in allowing disk users to save their text files to disk without having to go to a separate Disk I/O menu. Just pressing CTRL-Q at any time while in the editor or text mode performs a "quick save." Provisions are also included to automatically make a backup of your text file every time you save it to disk.

Main Menu and Editor

From the main menu, you can at any time go directly to the Editor screen by pressing the F1 function key. Similarly, you can go to the Format menu by pressing F2. This makes it very easy to jump back and forth between your text and either of the two menus.

You can select either the insert or overstrike mode by using CTRL-O to toggle between the two. CTRL-M now performs a true block move within the editor — you don't have to go back to the main menu. CTRL-Y does a word delete or "yank," and a "non-breakable space" can be created using the ALT key and the space bar.

Word wrap occurs at the current value of "characters per line," and not only at the edge of the screen, as in *TW-64*. (When the number of characters in a line of text approaches the value you have set for the number of characters per line allowed, the cursor automatically begins a new line. Word wrap can be toggled on or off depending on your preference. You can set characters per line in the Format menu as well as in Editor mode by pressing CTRL-@.

While the Read in File option displays only text files saved in ASCII form, the File List command lets you display *all* files on the disk and also returns the number of free granules remaining on the disk.

From the main menu you can also kill a file, change a filename, or print a file list. "Print File List" lets you send a list of the selected disk contents to your printer. This is a handy way to keep a hard copy of all your word processing files as you save them to disk, and it can even be used to catalog your disks.

Total characters used and the amount of remaining free memory are displayed at the bottom of the main menu screen. On my computer, the free memory amount was 48,123. This represents roughly enough space to accommodate 24 pages of text. As text is typed in, this number will decrease accordingly. On

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the other hand, the total characters number will increase as text is typed in.

The program defaults to Drive 0 but can be changed simply by pressing 1, 2 or 3 while in the main menu mode. Disk I/O is lightning fast, as the I/O programming is contained in memory. There is no wait when you want to access your disk. You're there instantly.

Options

The Options command on the main menu allows you to configure *Telewriter-128* to suit your personal preferences. The Options menu lets you select character color (63 choices) and background color (also 63 choices). The color changes occur live — that is, as you increase or decrease the values with the arrow keys, the screen and character colors change before your eyes. You can see instantly the color combination that best suits you. I like white letters on a royal blue background, but the choices are seemingly endless.

Another option lets you turn the color off if you are using a monochrome monitor or a black-and-white TV. You can also set the number of displayed lines on the screen to 24, 25 or 28. The text display on my CM-8 RGB monitor was great, and on the Magnavox 8915 it looked even better. If you plan on using a TV set, you may have to use the program in the 40-column mode due to lower resolution. You can toggle between 40- and 80-column modes with SHIFT-0.

Commands are also provided on the Options menu to set key repeat and delay rates and key click pitch. You can turn the key click on or off using CTRL-L. I like hearing the key clicks — they give me positive indication that a key has, indeed, been pressed. Whatever options you select can be saved to disk or tape so that you won't have to re-enter them each time you boot the program.

Format and Print

The Format and Print menu screen is accessed by pressing F2 at the main menu. This is where you select line spacing, margin settings and lines per page. As in *TW-64*, you can number the pages and select where across the bottom of the page to put the page number.

"VPrint" is a major addition that allows you to preview your document on the screen so that you can see how the document will look before you actually print it. It shows the margins, page breaks and page numbers just as they will appear on paper. Holding down a SHIFT key during preview slows down the scrolling speed of the document — you can change this speed in the Options menu if you want. This preview feature is a real bonus and will save a lot of printer paper and frustration.

Another new feature much to my liking is the #Print command, which allows you print out any number of copies of your document.

The *Print command is provided so that you can send a fully formatted file, complete with embedded control codes, margins and spacing, to disk. This kind of file is generally useful with a communications program when you want to ensure that the total file is sent intact.

As in *Telewriter-64*, you are able to print portions of a document. CTRL-E is used to mark the end of the portion of text that you want to print. Pressing the % key within the Format menu sends the marked portion to your printer. Also as in *TW-64*, you can right-justify your text. Note that the result of right-justification does not show up on the Editor screen, but it will show up on the VPrint screen and on the printed page, as well. *Telewriter-128* supports all baud rates and is adjustable from 110 to 9600 baud using the XMIT Rate command.

Other New Features

New to *TW-128* are 26 individual macros that can be used to store often-used text of up to 127 characters. A nice feature here is that you can also store embedded control code sequences. Anything you set up in these macros will automatically be saved to disk when you select Save on the Options screen.

This is nice because you can set up your printer for different fonts, print sizes, etc. Recalling a macro is as simple as pressing ALT and A through Z. In a typical application, one might have the words *University of Louisville* stored in Macro U. Let's say that I am preparing several letters to an alumni association. Instead of having to type *University of Louisville* many times, I can simply press ALT-U, and the words are automatically inserted in the text.

Pressing a CTRL-F while in the Editor results in a pop-up window where you enter the string of letters that you want to find in your document. A command in the Options menu can be set to ignore case. This means that words such as WORLD, World, or even wOrLd, could be found and displayed from just one reference. If you prefer, you can turn the case sense off so that the matching text must exactly match the search string.

TW-128 supports header and footer commands, as well as alignment protection for columns and many other embedded commands, including embedded control codes.

There is even a Help screen available by pressing CTRL-H. This is very useful in that you won't have to look up various commands and functions in the user's manual.

In Conclusion

Telewriter-128 is impressive. The extensive use of "dialogue" boxes or windows provides a more foolproof way to communicate with the program and results in very clean, efficient and smooth operation. It matches in many ways the capabilities of word processors used on IBM and compatible computers. *TW-128* has virtually all the features required of an excellent word processor except a spelling checker — although it should work with any ASCII-based spelling checker. Maybe the authors will give some thought to that need, especially considering that our CoCo now has a memory capacity of 512K!

Telewriter-128 will set the word processing standard for the Color Computer 3 because it is so simple and user-friendly; the price is about right for a program with the capabilities it provides.

The 81-page tutorial/user's manual is nicely done. It is written in easy-to-understand language, but the program itself is so easy as to make the documentation almost unnecessary. Most people will be able to use the software right out of the package.

About the only problem I could find with *Telewriter-128* is that it took such a long time to arrive in the CoCo 3 marketplace. I am confident, however, that, like good wine, it was worth the wait.

(Cognitec, 704 Nob Ave., Del Mar, CA 92014, 619-755-1258; $79.95 disk, $69.95 tape plus $2 S/H)

— Jerry Semones

Software CoCo 1, 2 & 3

REMUSIC 1.0 — Music to Your Ears

Anyone who has done any BASIC programming knows that there are two schools of thought concerning the use of REM statements. One advocates the frequent use of them to make detailed comments in the program listing so that you can pick up the program later and quickly tell what each line of code is doing.

The second school of thought advocates the concept that REM statements are a waste, eating up valuable memory and processing speed, and that it would be better to delete all REM statements and use the extra memory for better things. In fact, in the early days of personal computing, especially when memory was at the 4K level, there were a number of public domain programs around whose only function was to strip REM statements from a BASIC program.

Well, *REMUSIC* author, William C. Garretson, has just added a third school of thought on the use of REM statements: Make music with them!

REMUSIC 1.0 works on any Color Computer having at least 16K of memory and one disk drive. On the CoCo 3, it will work in the high-speed mode and makes for more pleasant sound reproduction.

The program is both a music compiler and a software music synthesizer supporting over six octaves of four-part music with complete tone and ADSR control. (For those of you who don't know what ADSR means, it stands for "Attack, Decay, Sustain and Release.")

OK, now everybody knows what ADSR is and can fully explain it, right? — *wrong*! One of the best things about *REMUSIC* is its documentation, which goes into great detail to explain not only how to operate the program but also just what all these "synthesized" music terms are, as well. It explains them in terms of how they affect our hearing and how the individual notes and sounds are created. (The author also included a glossary of such terms for quick reference.)

An added bonus to the accompanying documentation and tutorial (which because of its depth and detail could become somewhat trying) is the author's liberal use of witty and sometimes biting comments. Even if the program didn't work well at all, the documentation would be well worth reading.

In *REMUSIC*, Mr. Garretson has created a powerful music text language, incorporating it in such a fashion that the regular BASIC language of the CoCo provides the editor for it.

There are several ways to use the program. The simplest is to create what looks like a BASIC program in which each line is a REM statement. Each REM statement may contain information regarding the playing of one or more voices, and the duration and pitch of a note or rest. If the compiler encounters an invalid music directive in a REM statement, it skips to the next character. Placing other comment lines in the file may have a considerable effect on the compiled music.

Music code can also be embedded in a regular BASIC program with a few lines included at the beginning of the program to call *REMUSIC*. This feature can be used to create interesting graphic/music displays. The third way in which *REMUSIC* can be used is in the creation of stand-alone machine language music files. After a piece of music is written and compiled, it can be saved as a binary file.

Mr. Garretson seems to have put a lot of work into this program and has overcome many of the deficiencies I have noticed in other music compiler programs. For example, the author provides a way to program each voice separately without having to be concerned with what note duration the other voice is using; and he has provided his program with a respectable octave range. Some music programs have a limited range, which makes things difficult when you're trying to transpose a piece of sheet music to the computer. Others boast of a large range, yet tend to distort at the higher pitches. *REMUSIC* can play frequencies as high as the third A above middle C without excessive frequency distortion. In order to really appreciate this you need to pipe the sound output through a speaker of better quality.

As mentioned earlier, CoCo 3 owners can use the high-speed mode to further extend the pitch range and to enjoy better quality sound. However, this will also cause the music to play twice as fast. To overcome this problem, the author has included a utility to compensate.

If you are like me, the first thing you want to do with a music program is listen to just how good it really sounds. After all, isn't that the real test of any computer music program? What I don't want to do is sit down and key in a lot of code for just a simple demonstration. The author anticipated people like me, for he thoughtfully provided several selections of music already keyed in and ready to play. Very impressive, let me assure you.

This program rates very high on my recommended "must have" list.

(Codis Enterprises, 2301-C Central Drive, Suite 684, Bedford, TX 76021, 817-283-8571; $25)

— Kerry Armstrong

The Rat — A Mouse-Assisted CoCo 3 Graphics Package

Into the competitive arena of CoCo 3 graphics programs comes a powerful new challenger — *The Rat*. It was worth the wait. One of the most impressive features of the package is the mouse, which is much better than Tandy's CoCo mouse. In fact, there are very few things about the package that I did not like. (Contrary to the illustration of the mouse in Diecom's ad in THE RAINBOW, the mouse requires no adapter, and simply plugs into your right joystick port.)

While the program works very well on a 128K machine, you will not be able to access all its features until you have a full 512K. *The Rat* supports the 320-by-200 Hi-Res graphics mode, lets you work with 16 fantastic colors at a time, and even allows you to load and edit a picture created with *Color Max 2* or *Color Max 3*.

Upon booting *The Rat*, it does not take long before you are drawing your first picture. In fact, *The Rat*'s extreme ease of use may prove to be a disadvantage — family and friends might be tempted to commandeer the machine and program for themselves (it just about lost me my CoCo 3 to my sons).

I really would like to have seen some "professional" quality pictures, but there are no sample pictures accompanying the package. There is a very good picture of a rat, though, that pops onscreen while the program is loading, but you can't load it in to work with it. However, it wasn't too long before we had pictures of our own. As I said before, the program is very easy to use — and it's good that it is, because the 22-page manual is not the most comprehensive I have ever seen.

Commands are issued from the four pull-down menus that run across the top. Just point and click. The rest of the screen gives you the options of colors, type of "brush," the use of 16 textures, mode boxes (draw, line, circle, etc.), and a "fill" option to be used with box, circle and polygon modes.

BOWLING LEAGUE SECRETARY (C)
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RAINBOW CERTIFICATION SEAL

Reviewed:
Sept 1986 Page 141
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From the menu, if you have 512K, you can pick which of 10 screens you want to work with. With 128K, you can have only one screen in memory, but with 512K, you can work with up to 10 at the same time. This also allows you to use the "pages" feature. This feature allows screen animation in which the program flips through your screens with an order and speed you determine. If you do not have 512K, you still have the option of "color animation," which allows you to change the colors in a certain order and speed. By itself this feature can produce some interesting results.

Another strong point is *The Rat*'s versatility. If you want a different set of 16 colors, you can select them, just as you can select and save 16 new textures for later reloading. You can even define your own character set or just edit the default set. Even the brush shapes are redefinable. The options available are just too numerous to list. And, again, I have to say that the mouse included with the package is just great! I was so accustomed to the mouse I use with my Tandy 1000 that I guess I got spoiled — I never liked any that were available for the CoCo. But, I have to admit, I like the mouse that comes with *The Rat* better than even my MS-DOS mouse.

In fact, the two mice are very similar in construction. Both are high-quality digital mice with two action buttons. *The Rat*'s mouse (doesn't that sound peculiar?) fits the hand very well, and suits the program. The two "rodents" complement each other nicely. Both buttons are supported, in most cases with a single and double click. This means you do not have to always scamper to the menu to get things done. In a lot of cases, the double click allows you to edit the defaults of the program.

Now, with all the good things I've said about the *The Rat*, I cannot go one further and say I thought it was perfect. One thing missing is an "Are you sure?" feature. My son accidentally wrote over some of his hard work by saving a screen with a name that had already been used, and there was no recovery. Another feature that's absent is a way to exit the program without turning off the computer. With such a good program, this seems a rather crude way of exiting. Also, I think the manual could be expanded, and a few sample pictures would be a nice addition.

After all the pros and cons are tallied, I still think this is the best and easiest of all the graphics packages I have used or seen. I can tell you how good the package is, but you will not really appreciate *The Rat* until you see and work with it. I cannot wait to see someone who is good at drawing turn in a picture for the CoCo Gallery using *The Rat*. If you are thinking of buying another graphics package, just wait until you've seen this one. If you think you are not at all interested in owning a graphics package, I'll bet you'll change your mind. Once you've seen *The Rat*, Diecom will probably get some of your money.

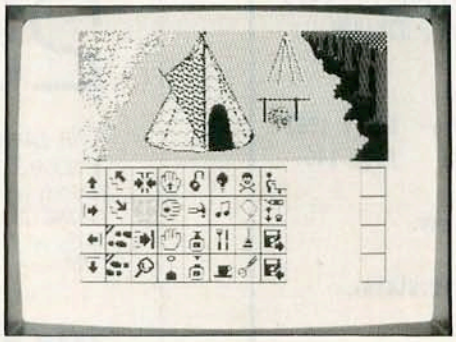
(Diecom Products Inc. 6715 Fifth Line, Milton, Ont., Canada L9T 2X8, 416-878-8358; $69.95 U.S., $99.95 Cdn.)

— Dale Shell

Software CoCo 2 & 3

Indiana Jim — A Fight for Survival

Imagine yourself on a beach with a vast ocean on one side, a dense forest on the other, and a band of vicious Indians chasing you as you plunge headlong into Indian territory. This all takes place in the opening of a unique graphics Adventure, *Indiana Jim*.



When the game begins, you set out to find a way back to civilization through Indian territory, a dense forest, caves, mountains, a desert and a town.

Indiana Jim, made by Lomiq, Inc., comes on two unprotected disks, requires a joystick and works on the CoCo 2 and 3.

The manual, in my opinion, is the only real flaw in this program because it never mentions the object of the game, nor is any information given that might help with the commands. However, this game is unique in that the software can be used by anyone of any language as it is based entirely on icons and symbols. This is basically the only thing the manual tells you other than the loading procedure for single or dual drives and the warranty information. The manual, written in English, Spanish and French, explains the meanings of the icons that appear on the screen.

The screen is divided into two major parts. The top part is the graphics display and the bottom is the icon menu. In the menu are icons used for movement (the standard N, S, E and W) and other necessary actions for game play (GET, EXAMINE, KILL, etc.). Next to the icon menu is a space for the display of your inventory, which may hold no more than four objects at a time, and four boxes to show objects that were dropped on that particular screen.

The game is relatively difficult without the aid of a story line for reference, but, overall, it is most suitable for the intermediate Adventurer. I found it annoying that, in the game, you can easily die without warning. If you do need help, however, you can take a peek at the solution sheet of all 235 moves. Even if more instructions were given, accomplishing your goal would be no easy feat.

(Lomiq, Inc. CP 105, Succursale A, Jonquiere, Quebec, Canada G7X 7V8; $28.95 U.S.; $38.95 Cdn.)

— Glen Baisley

Reviewer Information

In order to continue to bring Tandy Color Computer users all the best information about new hardware and software products each month, we are expanding our independent review staff. Therefore, we invite you to join THE RAINBOW's elite fleet of reviewers.

You read THE RAINBOW because you love your Tandy Color Computer, so if you want a creative outlet and a chance to examine quality hardware and software, with your observations published nationwide, we want to hear from you.

Send us a cover letter with your name, address, occupation, list of equipment, areas of general interests, and a sample review of a CoCo product you are currently using. We look forward to your response. After all, we already see you have the best taste in computers.

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(See January '88 review)

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This is the long-awaited response to the huge demand for a Kung-Fu program for the CoCo. Destroy opponents and evade obstacles as you grow even closer to your ultimate objective! (See Feb. '88 review) Disk..... $24.95

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Received and Certified

The following products have recently been received by THE RAINBOW, examined by our magazine staff and issued the Rainbow Seal of Certification, *your assurance that we have seen the product and have ascertained that it is what it purports to be.*

The Comprehensive Color Computer Anti-Clutter Kit, a reference guide designed to supplement and condense the information in Tandy manuals, including definitions, color tables, graphics codes, memory map, peeks/pokes, explanations of error codes, etc. *Heritage House Lithographers, P.O. Box 629, Hungerford, TX 77488; $9.95.*

Laser Surgeon: The Microscopic Mission, an educational Adventure in which the player is a laser surgeon directing a healing laser probe through an injured person's body to the brain. For the CoCo 3. *Activision, Mountain View, CA 94039; $29.95. Available in Radio Shack stores nationwide.*

Mini Database, a menu-driven 32K database designed to keep track of from 50 to 100 entries. For the CoCo 1, 2 and 3. *Tothian Software, Inc., Box 663, Rimersburg, PA 16248, $14.95.*

MJK, a disk operating system featuring key repeat, full screen editor, line editor, modified editing commands and unabbreviated error messages. For the CoCo 1, 2 and 3. *CoCo Connection, 5003 B St., Philadelphia, PA 19120, (215) 457-1809; $39.95.*

RADIOLOG +3, a program designed to keep a station log for an amateur radio station; comes with a "key" for the right joystick port. *Sunrise Software, 8901 NW 26th St., Sunrise, FL 33322, (800) 628-2828, Ext. 552; $19.95 plus $2 S/H.*

REMUSIC 1.0, a music program for CoCos 1 and 2 that has now been updated for the CoCo 3. *Codis Enterprises, 2301-C Central Drive, Suite 684, Bedford, TX 76021, (817) 293-1202; $12.*

RS-232 Cable and RS-232 Switcher, an extender cable and a switcher that allows you to switch between several RS-232 devices without disconnecting them. For the CoCo 1, 2 and 3. *Radcomp Computers, 919 E. Lemon #207, Tempe, AZ 85281, (602) 894-6489; 2-way Switcher, $10; 3-way Switcher, $11.50; Extender cable, $4.*

System 5, a graphics generator that features 320-by-192 16-color graphics, pull-down and page-down point-and-click menus, full screen workspace, nine different fonts, and more. It requires 512K and is for the CoCo 3. *Elec-Soft, 803d W. 47th St., Norfolk, VA 23508, (804) 451-1255; $12.*

Telewriter-128, an updated version of the *Telewriter-64* word processor for the CoCo 3. Features include macros, print preview capability and instant online help. *Cognitech, 704 Nob Ave., Del Mar, CA 92014, (619) 755-1258; $79.95.*

Thexder, an arcade action game in which the player pilots a robot through caves, vast cargo holds and spaceship interiors to do battle with 20 types of aliens. Supplied on a ROM pack, for the CoCo 3. *Sierra On-Line, Coarsegold, CA 93614; $24.95. Available in Radio Shack stores nationwide.*

VIP Integrated Library, an integrated software system that includes *VIP Terminal, VIP Writer III, VIP Calc, VIP Database, VIP Speller* and *VIP Disk-Zap*. All programs except *VIP Writer III* work on CoCos 1 and 2. Upgrades are available. For the CoCo 3. *SD Enterprises, P.O. Box 1233, Gresham, OR 97030, (503) 663-2865; $149.95.*

Wargame Designer, a 128K menu-driven program that allows you to create your own military simulations. No programming knowledge is required. For the CoCo 3. *SPORTSware, 1251 S. Reynolds Road, Suite 414, Toledo, OH 43615, (419) 389-1515; $29.*

First product received from this company

The *Seal of Certification* program is open to all manufacturers of products for the Tandy Color Computer, regardless of whether they advertise in THE RAINBOW.

By awarding a *Seal*, the magazine certifies the product does *exist* — that we have examined it and have a sample copy — but this *does not* constitute any guarantee of satisfaction. As soon as possible, these hardware or software items will be forwarded to THE RAINBOW reviewers for evaluation.

— Lauren Willoughby

Clubs, Clubs, Clubs

We compile a list quarterly of Color Computer Clubs because of the many requests we receive. CoCo Clubs may wish to exchange newsletters, share ideas for topics of discussion at monthly meetings, etc.

Please let us know if we have omitted any clubs and send us complete up-to-date addresses. Only those clubs that have signed our anti-piracy agreement form will appear in this listing of CoCo Clubs. Also, please notify us if you wish to add or delete any names on this list. Send your information to:

CoCo Clubs
THE RAINBOW
The Falsoft Building
P.O. Box 385
Prospect, KY 40059

— Monica Wheat

ARIZONA

Tucson Color Computer Club, Bill Nunn, 9631 E. Stella, Tucson, 85730, (602) 721-1085

CALIFORNIA

Color America Users Group, Mark Randall, 2227 Canyon Road, Arcadia, 91006, (818) 355-6111

CoCo-3 World, Fred K. Wright, 10112 Melody Park Dr., Garden Grove, 92640, (714) 534-5174

Los Angeles-Wilshire Color Computer Users' Group, Norm Wolfe, P.O. Box 11151, Beverly Hills, 90213, (213) 838-4293

United Computer Federation, (San Fernando Valley Chapter and Headquarters), Pete Ellison, 366 West Providencia Ave., Burbank, 91506, (818) 840-8902

United Computer Federation, (San Francisco Chapter), Art Murray, P.O. Box 7007, Redwood City, 94063, (415) 366-4560, BBS (415) 364-2658

United Computer Federation, (Los Angeles Chapter), Gary James, 4147 Faculty Avenue, Long Beach, 90808

United Computer Federation, (Orange County Chapter), Fred Wright, 10112 Melody Park Drive, Garden Grove, 92640

The Davis CoCoNuts, Shneor Sherman, 1818 Haussler Dr., Davis, 95616, (916) 758-3195

South Bay Users Group (S-Bug), Patricia Scheffer, P.O. Box 653, Hawthorne, 90251, (213) 532-8071

Ventura County Color Computer Club (VC4), Doug McLaughlin, Oxnard Public Library, 214 South "C" Street, Oxnard, 93030, (805) 984-4636 or BBS (805) 484-5491

Citrus Color Computer Club, Jack Brinker, P.O. Box 6991, San Bernadino, 92412, (714) 824-1866

South Bay Color Computer Users Group, John G. Say, 3117 Balmoral Drive, San Jose, 95132, (408) 923-2967

COLORADO

Colorado Color Computer Club, Lloyd Carroll, 6651 Bellaire Street, Commerce City, 80022, (303) 288-6369

The ESCO Computer Club, David E. Schulz, 1299 Harrison Street, Denver, 80206, (303) 388-6988

CONNECTICUT

The Southeast Connecticut Color Computer Users Group, Bill Gross, 30 Sycamore Lane, Groton, 06340, (203) 448-1388

DISTRICT OF COLUMBIA

Northern Virginia C.C. Club, Bruce Warner, 14503 Fullerton Rd., Dale City, Virginia 22193, (703) 690-2453

FLORIDA

Color Computer Club of Brandon, Richard Steinbrueck, 2913 John Moore Road, Brandon, 33511, (813) 681-1526

Northwest Florida CoCo Nuts, Lee Gottcher, P.O. Box 1032, Fort Walton Beach, 32549, (904) 678-8894

Alachua County Color Computer Club, Robert J. Lake, 2929 N.E. 12th Street, Gainesville, 32609, (904) 378-1993

Jacksonville Color Computer Club, William H. Brown III, 2411 Hirsch Ave., Jacksonville, 32216, (904) 721-0282

Broward County Color Computer Club, George Aloia, 2263 N.W. 65 Avenue, Margate, 33063, (305) 972-0975

South Brevard Color Computer Club, Benjamin S. Jerome, 496 Hillside Court, Melbourne, 32935, (305) 259-4609

Color-6809 Users Group, Emery Mandel, 4301 11th Avenue North, St. Petersburg, 33713-5207, (813) 323-3570, BBS (813) 321-0397

C.C. Club of Sarasota, Ernie Bontrager, 4047 Bee Ridge Rd., Sarasota, 33583, (813) 921-7510

GEORGIA

The Northeast Atlanta Color Computer Club, Joe Novosel, P.O. Box 450915, Atlanta, 30345, (404) 921-7418

The CoCo Cartel, Dennis M. Weldy, 4059 Acacia Drive, Columbus, 31904, (404) 576-5479

Atlanta Color Computer Users Group, Terry E. Love, 5155 Maroney Mill Rd., Douglasville, 30134, (404) 949-5356

ILLINOIS

Illinois Color Computer Club of Elgin, Tony Podraza, 119 Adobe Circle, Carpentersville, 60110, (312) 428-3576

Northern Illinois Color Computer Club, Kenneth Trenchard, Sr., 6145 N. Sheridan Road 30, Chicago, 60660, (312) 973-5208

Willow-Works Club, Kevin L. Adair, 5753 S. Laflin, Chicago, 60636, (312) 737-5716

Glenside Color Computer Club, Ed Hathaway, 8 W. Stevenson Drive, Glendale Heights, 60139, (312) 462-0694

Kitchen Table Color Computer Group, Robert Mills, P.O. Box 464, Hanover, 61041, (815) 591-3377

Motorola Microcomputer Club, Steve Adler, 1301 Algonquin Rd., Schaumburg, 60196, (312) 576-3044

Chicago OS-9 Users Group, John Chasteen, 480 Gilbert Drive, Wood Dale, 60191, (312) 860-2580

INDIANA

Three Rivers Color Computer Club, Eddie Nast, R.R. 3, Box 269, Angola, 46703

CoCo Program Exchange, Erik Merz, 3307 Arrow Wood Dr., Fort Wayne, 46815, (219) 749-0294

Indy Color Computer Club, Kevin S. Jessup, Sr., P.O. Box 26521, Indianapolis, 46236, (317) 873-5808

Southern Indiana Computer Club, Route 1, Box 459, Mitchell, 47446

Michiana CoCo Club, Clay Howe, 310 S. Jefferson St., Sturgis, 49091, (616) 651-4248

IOWA

CoCo Questers, Scott Bellman, 2420 Salem Court, Bettendorf, 52722, (319) 359-7702

Metro Area Color Computer Club (MACCC), David E. Hansen, 3147 Avenue J, Council Bluffs, 51501, (712) 323-7867

Mid Iowa CoCo, Terry G. Simons, 1328 48th Street, Des Moines, 50311, (515) 279-2576

Dubuque Tandy Users Group, Wesley Kullhem, 1995 Lombard, Dubuque, 52001, (319) 556-4137

KANSAS

Hutchinson Color Computer Club, John Collicott, 201 E Morgan, Inman, 67546, (316) 585-2320

KC CoCo Club, Gay Crawford, P.O. Box 11192, Kansas City, 66111, (913) 764-9413

Micro 80 Users Group, Kevin Cronister, 2224 Hope, Topeka, 66614, (913) 272-1353

Color Computer Club of Wichita, David Brimmer, 527 N. Pershing Ave., Wichita, 67208, (316) 685-9587

KENTUCKY

Perry County CoCo Users Group, Keith W. Smith, General Delivery, Hardburly, 41747, (606) 439-4209

LOCO-COCO, Jim Spillman, 2405 Woodmont Dr., Louisville, 40220, (502) 454-5331

The Basic Byte, Don Henderson, 152 Patty Lane, Florence, 41042, (606) 371-9368

Hardin County Color Computer Club, Paul W. Urbahns, 2887 Republic Ave., Radcliff, 40160, (502) 351-4757

LOUISIANA

Cajun CoCo Club, Rick Herbert, P.O. Box 671, Crowley, 70526, (318) 788-3148

The CoCo Sig, Christopher Mayeux, 20 Gibbs Drive, Chalmette, 70043, (504) 277-6880

MAINE

Western Maine Color Computer Club, Michael Newell, Box 780, Bethel, 04217

Tandy Computer Club, Delmer Cargill, P.O. Box 428, Westbrook, 04092, (207) 854-2862

MARYLAND

Arkade, John M. Beck, 3513 Terrace Drive #D, Suitland, 20746, (301) 423-8418

MASSACHUSETTS

The Computer Connection, Ken Ferreira, 21 George St., Oxford, 01540, (617) 987-0197

Greater Boston Super Color Users Group, Robert Biamonte, 6 Boulder Drive, Burlington, 01803

CLUB 6809, Jean Salvas, 204 East Street, Springfield, 01104, (413) 734-5163

MICHIGAN

Color C.H.I.P.S., Jack Pieron, 3175 Oakhill Place, Clarkston, 48016, (313) 627-4358

Tandy Users Group of Grand Rapids, Robert M. Worth, Jr., 1726 Millbank S.E., Grand Rapids, 49508 (616) 245-9324

Greater Kalamazoo Color Computer Club, Jim Rix, 1835 Chevy Chase Blvd., Kalamazoo, 49008, (616) 344-7631

Greater Lansing Color Computer Users Group, P.O. Box 14114, Lansing, 48901

Michiana CoCo Club, Clay Howe, 310 S. Jefferson St., Sturgis, 49091, (616) 651-4248

Color Computer Owners Group, Charles Van Ark, c/o DSL Computer Products, Inc., 4950 Shaefer, Dearborn, 48126, (313) 582-8930

MINNESOTA

Gallifrean Recall Circuit, Dr. Who Fan Club/Newsletter, Robert Hermanek, 216 Cardinal Ct., Chaska, 55318, (612) 448-7911

Northern Minnesota CoCo Community, David B. Smith, 4112 Trinity Road, Duluth, 55811, (218) 726-0511

MISSISSIPPI

Singing River C.C. Club, James F. Wilson, 2619 Wilson Ave., Pascagoula, 39567, (601) 762-4318

Gulf Coast Color Computer Assoc., Ed Keels, 22 Christy Cove, Gulfport, 39503, (601) 832-1210

Jackson Color Computer Club, Dorothy N. Welch, 424 Church Street, Madison, 39110, (601) 856-7255

CoCo Art Club, Joel Bunyard, Rt. 16, Box 11, Meridian, 39301, (601) 483-0424

MISSOURI

North County 80 Group, Tom Vogel, 12 Ville Donna Ct., Hazelwood, 63042, (314) 739-4078

Mid-America Color Computer User's Group, Jerry Morgon, 807 Ponca Drive, Independence, 64056, (816) 796-5813

Coconuts, Steve Knittel 1610 N. Marlan, Springfield, 65803, (417) 485-3419

Mako TRS-80 & Tandy Users Group, David Morgan, 622 Porter, Joplin, 64801, (417) 781-6546

NEBRASKA

Siouxland Color Computer Club, Alan Pedersen, 611 D Street, South Sioux City, 68776, (402) 494-2284

NEVADA

C.A.T. F.U.N., Paul A. Osborne, 201 Miners Road, Fallon, 89406, (702) 423-5789

NEW JERSEY

West Orange CoCo Club, Gregg Favalora, 12 Blackburne Terrace, W. Orange, 07052, (201) 736-1748 (let ring 12 times)

Mercer County Color Computer Users Group, Richard C. Kelly, 1904 Country Lane, W. Trenton, 08628, (609) 883-9270

NEW MEXICO

Chaves County Color Computer Club, Harry Machen, 18 Forest Drive, Roswell, 88201,

CoCo Users Group, David M. Hutchison, 732 Landman Pl. NE, Albuquerque, 87123, (505) 294-4732

The Curry County CoCo Club, Ron Bull, 100 Conestoga Trail, Clovis, 88101, (505) 763-4713

NEW YORK

Adirondack CoCo Club (Albany Chapter), Ron Fish, Box 4125, Albany, 12204, (518) 465-9793

Adirondack CoCo Club, (Greene County Chapter), Pete Chast, P.O. Box 61, Athens, 12015, (518) 945-1636

Adirondack CoCo Club (Glens Falls Chapter), Richard Mitchell, 39 Center St., Fort Edwards, 12828

The Island CoCo Club, D.K. Lee, P.O. Box 426, Massapequa Park, 11762, BBS (516) 277-1285

Kings Byte CoCo Club, Morty Libowitz, 1063 East 84th St., Brooklyn, 11236, (718) 763-4233, BBS (718) 837-2881

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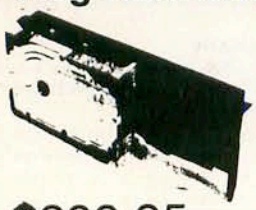

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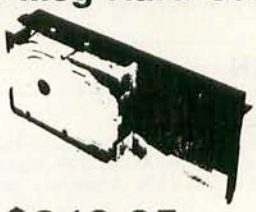

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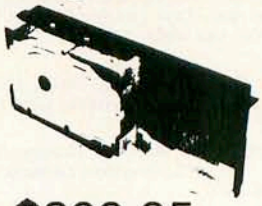

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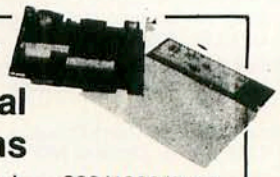

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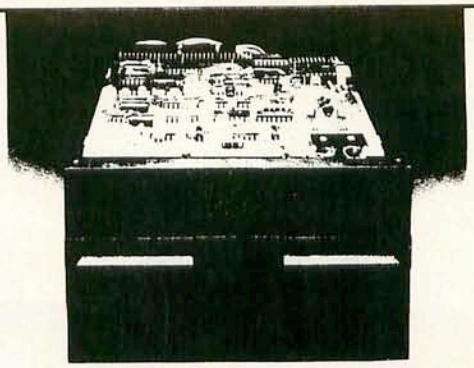

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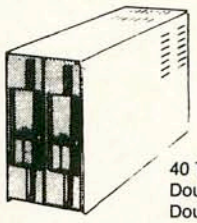

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The CoCo Power User

By Alan J. Corson

Power User: the phrase conjures up visions of a Pierre Cardin-bespeckled, Gucci-shod, silk- and tweed-clad micro guru, crunching away on massive spreadsheets, sorting and searching huge databases, and amalgamating all with his instant spell-checking, thesaurus-spouting, automatic outlining, window-framing word processor running on his $10,000, 4-Mb, 12-MHz Belchfire Turbo 386. Phew! This is the image of the Power User that has been touted within the MS-DOS and Macintosh corporate worlds. How can our humble little CoCo 3 ever measure up to supporting such an image? It can, with a whole lot less fuss, bother and, above all, cost!

With its simple beginnings in 1980, the 4K CoCo began introducing a whole new world of computing to many individuals who only *10* years earlier had their sole programming experience on large, intimidating, remote batch-oriented multi-megabuck mainframes. With its limited memory, the CoCo could not then compete as a business system. As memory technology advanced, however, the CoCo's memory also grew to its 64K-addressable limit.

Alan Corson, an Air Force major presently serving in Cairo, is an information systems engineer who sees a growing market for the CoCo as a small-business machine.

But to get to that memory, something else had to be provided to overcome the 32K limitation hard-coded into Color BASIC.

The folks at Microware and Tandy had the answer: OS-9 Level I, a proven operating system already running on 6809 machines across the country in real-time process control applications, a very demanding industrial environment. Modeled after UNIX (with some very smart improvements in efficiency), OS-9 provided access to all of the CoCo's memory, plus a whole lot more: tree-structured hierarchical filing systems, extremely flexible input/output capabilities, multitasking and multiuser features. By the way, all these capabilities were (and still are) available for under $100 from Radio Shack, 10 times less expensive than UNIX (actually XENIX, the PC version of mainframe UNIX).

In 1983, OS-9 with a 64K CoCo was a whole lot of computing horsepower, but with very little applications software available. "Little feller" was still relegated to acting as a development machine in homes or as an educator in schools. However, dedicated CoCo-Nuts perceived a need and over the next three years, small-business-oriented software began to appear: *Telewriter*, the VIP series, and the Elite series, all under RS-DOS. Then OS-9 products followed: *DynaCalc, Data Bank* (licensed as *Profile* by Tandy), *DynaStar, Stylograph*, the X-series from Microtech, and the Business Application series from Computerware.

All along, our archetypical Power User still turned up his nose at the CoCo because of the memory limitations imposed by the 16-bit address-bus limitation of the 6809. (One fact still escapes the 80XX community: The 6809 internally is a 16-bit processor, fully as capable as an 8088, with a RISC-like (Reduced Instruction Set Computer) machine language. In July 1986, Tandy shattered the memory limitation with the announcement of the Color Computer 3: 128K RAM, expandable to 512K, and able to run OS-9 Level II at 2 MHz. Software developers scrambled to update their software to use the windowing facilities of Level II, but the vast majority of OS-9 software would still run without major modification, thanks to the stringent software-developers standards inherent within the OS-9 environment. Those standards produced compact, modular, relocatable, re-entrant code.

Now the CoCo 3 has the hardware, the operating system, and the applications software capable of supporting a potential Power User. How do I know? I *am* one! Yes, I'm the proud owner of a 512K CoCo 3 liberally stuffed with RGB monitor, two DSDD drives, one DSQD 80-track drive, MPI, RS-232 Pak, and a Disto 512K Super RAM Disk Pak. I use this system daily at

work, cruisin' with my CoCo while my MS-DOS compatriots are steaming and fussing on their -XT "boat anchors." How do I accomplish this, and how do I qualify as a Power User? Stick around, and watch the magic of OS-9 Level II harness for work!

Each morning when I fire up "Euclid" (my CoCo 3), in goes a Level II System disk with three procedure files: `Start-Up`, `ColdStart` and `Wset`. `StartUp` starts the clock, initializes my system and custom-configures it for my use. `ColdStart` formats and loads up the RAM disk with all my executable files (about 382K worth) from a floppy disk image loaded in the 80-track drive (`/d2`). Next, the simple file `Wset` starts the real Level II magic. Here it is:

```
chx /r0/cmds
chd /r0
wcreate -z
/w1 -s=2 00 00 80 24 03 02 02
/w2 -s=2 00 00 80 24 05 02 02
/w3 -s=2 00 00 80 24 07 02 02
/w4 -s=2 00 00 80 24 05 02 02

shell i=/w1&
shell i=/w2&
shell i=/w3&
shell i=/w4&
```

Kinda cryptic, isn't it? Not to worry, a short perusal through the OS-9 Level II Operating System Manual "Getting Started" and "Windowing System" sections will make it all clear (really!). Allow me to help: First, Euclid switches to his fast-access RAM Disk, `/r0`, then invokes the windowing utility `Wcreate`. The next four lines tell `Wcreate` to set up four windows, each 80 columns by 24 lines. Each window will have black borders and black backgrounds. The foreground colors will be green, amber, blue and amber, respectively. This gives me four different "terminals": Green, amber, blue and amber (again). A carriage return tells `Wcreate` that it is finished, and the last four lines set up shell environments in each of the windows.

I now have four CoCos at my disposal, each displaying an 80-column screen in a different color. Let's call them `/w1`, `/w2`, `/w3` and `/w4`. Actually I have five, because the basic green screen (known as `/term`, or the hardware screen) is always available to return to, should I need it for System Operator housekeeping functions. In fact, that is the screen I'm still looking at after `Wset` gets finished. So, if I press the CLEAR key once, I am in `/w1`, a green on black terminal displaying the OS9: prompt of an active shell. I start up a word processor here, Computerware's *Screen Star*. Five seconds later, *Screen Star*'s opening help menu is visible, waiting for commands. If I press the CLEAR key again, I'm in `/w2` now, an amber terminal, and I'll start up my communications package, *Color Connection III*. Press the CLEAR key again, and I'm in `/w3`, a bright blue (cyan) on black terminal (interesting combination, but still very readable). Here I need my spreadsheet, and *DynaCalc* comes to life. One more press of the CLEAR key and `/w4` appears: *Profile*, my database application, is started. Now, with the CLEAR and SHIFT-CLEAR key combinations at my disposal, I can instantly switch between word processing, data communications, spreadsheet operations, or database work. How much memory am I using for all this? I'll ask my SysOp, `/term`. CLEAR key to all green, and enter the command `mfree`. Euclid responds with the following:

```
Blk  Begin   End     Blks   Size
---  -----   -----   ----   ----
 24  48000   77FFF    18    192k
                      ===   ====
                Total: 18    192k
```

No sweat! Euclid still has 192K of RAM left over. OK, I have all this computing power at my disposal, how do I qualify as a Power User?

At my job here in Cairo, I assist the Arab Republic of Egypt's Armed Forces in developing their command, control and communications capabilities. Also, as the token communications-electronics engineer on the staff of the Office for Military Cooperation, I act as the communications officer for the agency. This responsibility calls for planning, budgeting, and managing all the "comm" assets needed to support our operations at the American Embassy. Recently we had to upgrade our radio network rather rapidly, and the word came down from "on high": "Al, you have $20,000 to spend, but you must do it in five days."

OK, Euclid, let's rock and roll! First, a *DynaCalc* spreadsheet to cost out alternatives and decide on the best solution. Next, a search of the *Profile* spares database and personnel listing to find out how much extra equipment to order. Switch back to the spreadsheet and add the quantities. Save that spreadsheet to a file. Finally, prepare letters to the procurement people with *Screen Star*, merging the spreadsheet file into the letter to provide quantities, part numbers, and total estimated costs. Total time spent? Two days, with the majority of the time spent researching catalogs and obtaining current price information. Result: Money effectively spent quickly to meet a critical time-sensitive need. Am I so great? No, but Euclid, OS-9 and a whole host of CoCoNut software programmers sure made me look good!

What is my point here? Simply that the CoCo 3 has "arrived" as an effective small-business office automation tool. Euclid's ability to instantly switch among the three major business applications of word processor, spreadsheet and database allowed me to seamlessly construct a product, with no breaks in thought or action. That is Power User computing, and throughout this process, Euclid wasn't even breathing hard! When I switched from one task to another, the first task was "marking time" as I worked on the second task. With the Belchfire 386, that's normal. With Euclid, that's a waste! If I had been really good, (and my spreadsheets and databases were big enough), Euclid could have been recalculating a spreadsheet, searching a database, and listening for my fumbling fingers with the word processor, all at the same time!

Yes, there are many other systems able to do the same thing, but Euclid (or any other similarly equipped CoCo 3) can support this type of Power User computing for under $1,500. MS-DOS can't match that; XENIX, OS/2, Concurrent DOS 386 can't match that; *DesQview, GEM* or Microsoft *Windows* can't match that on any 80XXX-based system on the market today.

With such an elegant solution at hand here, any engineer would first test for the optimum (which I feel has been successfully demonstrated here), then generalize the solution. Remember the multiuser capabilities inherent in OS-9? With `Login` patched from OS-9 Level I to Level II (courtesy of Greg Law, as reported by Mssrs. Esposito and Libra in their "Doctor ASCII" column, November 1987) and `Tsmon` activated, a second user can be added via an RS-232 port and an inexpensive terminal . . . . I'm getting ahead of myself. That is a subject worthy of an entire article.

From Cairo, Egypt — *maa' salaama*, y'all!

(Questions or comments may be directed to the author at AMEMB/OMC-AV, Box 29, FPO NY 09527-0051.)

Lack of Infinite Precision

I have an 'E' board CoCo, which I have upgraded to 64K. Since the upgrade, my CoCo no longer subtracts correctly. The problem seems to occur when I use variables to store the numbers. For example, if I set `A=$123.49` *and* `B=$56.89` *then subtract* `B` *from* `A`*, I might get $66.60 or something like $66.590003. Are my suspicions about the upgrade correct or am I way out in left field?*

Richard Jones
Quincy, IL

Rx The problem is not related to your upgrade, but to decimal-binary floating-point conversion and lack of infinite precision. Decimal fractions 0.1, 0.01, etc., are repeating binary fractions and, on occasion, some of the digits get lost. This is analogous to using pencil and paper to divide 10 by 3, yielding 0.33. If you then multiply 0.33 by 3, you get 0.99, *not* 1.0. If infinite precision were possible, in both cases, the results would be exact. In your programs, use `PRINTUSING` instead of `PRINT` and round the results to help alleviate this problem.

If You Fall Into an Error Trap

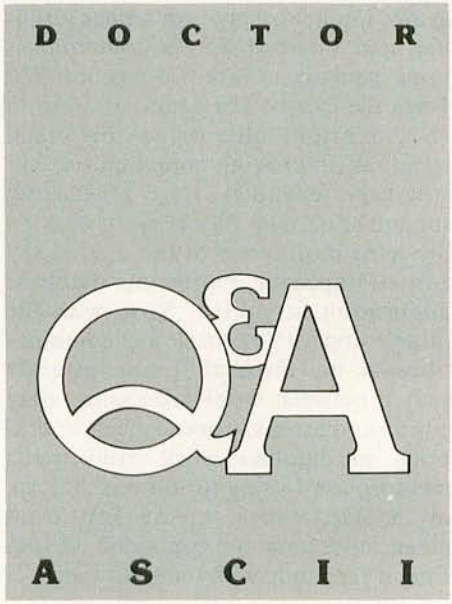
I have a new CoCo 3 with DOS 1.1. While recently experimenting with the error-trapping routine, I found that an FC Error comes up as Error Number -1. My manual says it is Error Number 4 and that Error Number -1 does not exist. What gives?

Doug Lute
Clymer, PA

Rx I assume you were using an `IF` statement. On the CoCo and other computers such as the IBM PC and Apple II, which use Microsoft BASIC, the logical value `TRUE` is a -1.

Richard Esposito is a principal engineer with BDM Corp. He holds bachelor's, master's and doctorate degrees from Polytechnic Institute of Brooklyn. He has been writing about microcomputers since 1980.

Richard Libra is a simulator test operator for Singer Link Simulation Systems Division.



By Richard E. Esposito
Rainbow Contributing Editor
with Richard W. Libra

Controller Restrictions

When it is stated that a program cannot run with the disk controller plugged in, does that mean there isn't enough memory for the computer to run the program and work the disk drive, or does that mean the program has some machine language coding in it that cannot work if the controller is plugged in?

Omri Goren
Reseda, CA

Rx Unfortunately, I cannot give you a blanket rule; it could be either.

High Poking Disk BASIC 1.1

I read recently about someone whose Disk BASIC 1.1 would accept the high speed poke without any trouble when doing input and output. I also have Disk BASIC 1.1, but my computer puts random characters on the screen and changes some of the program currently in memory. It also damages files on my disk. Are there any hardware fixes I can do to make the high speed poke work with my disk controller?

Jeff Bradley
Walkerville, MD

Rx The incompatibility with the 2MHz clock speed is not due to the version of Disk BASIC, but the disk controller hardware itself. The older disk controllers that required 12 volts and were designed for the CoCo 1 cannot handle this speed. If you have one of these controllers, it is best to acquire a newer controller that is rated for 2MHz. While the CoCo 3 to a large degree is software-compatible with the CoCo 1 and 2, from a hardware standpoint (although the BUSS is the same), it is a totally different machine.

Swapping Keyboards

I have a 64K CoCo 2 on which the X key no longer works. Is the keyboard matrix on the CoCo 3 keyboard the same as on the CoCo 2 keyboard? If so, can I replace it with a new CoCo 3 unit? I realize that a few new keys will not be recognized by the CoCo 2, but that is not a problem.

Ronald Landwehr
Wheeling, IL

Rx The CoCo 3 keyboard (Radio Shack Part No. AXX-0245) is a drop-in replacement for a CoCo 2. If used with an older CoCo 1, an adapter for the mylar cable may be required.

Misalignment Messes Communication

I have a 512K CoCo 3 and two disk drives. I have found that head alignment on one drive can get so far out that programs saved on one drive cannot be read on the other. This fact is not immediately obvious; the problem first appears in "backup" failures, but only erratically. Will the J&M Systems "Precision Alignment Disk & Memory Minder Manual S/S" advertised in THE RAINBOW allow me to do the head alignment required to keep this problem under control?

Ralph C. George
Anchorage, AK

Rx If the problem is misalignment, the kit will help; but if it is a chronic problem, the money would be better spent in buying a newer replacement drive. This is especially true if the drive is one of the original, gray-housed RS full-height drives made by T.E.C.

Accessing 64K

I have a 64K CoCo 2 (32K RAM) and a cassette drive. Do I need to install a chip upgrade in order to get the full 64K RAM?

Paul Demick
Stephentown, NY

Rx Access to more than 32K, when using even a 512K CoCo 3, is limited not by the hardware but by the ROM software.

Searching for the Elite

About five years ago I purchased the program Elite * File *from Radio Shack, but I can no longer find documentation for it. Would you happen to have the address for Elite Software, Inc.?*

Mike Brunkow
St. Joseph, MO

Rx As of March 1986, the address of Elite Software was 201 Penn Center Blvd., Pittsburgh, PA 15235, (412)795-8492. Advertisements for their software last appeared in THE RAINBOW in that month.

80-Column Boot-Up in *Multi-Vue*

I was disappointed with Multi-Vue *in that the system boots up in 40-column mode. Is there any way to fix this?*

See Pg 159

Joel Gray
Baton Rouge, LA

Rx Thanks to Kent Myers, changing Offset $3A99 of `GShell` from $06 to $07 will make the default 80 columns.

2 Into 3 *Might* Go

Is there a way to upgrade my 64K CoCo 2 to 512K and make the language compatible with the CoCo 3?

Jason Lattimer
Canal Winchester, OH

Rx J & R Electronics can supply you with their 512K *Banker II* upgrade for your CoCo 1 or CoCo 2, but with it, you will need custom software for the extra memory as it is not mapped in the same way as on the CoCo 3. Unless you write your own, the supplied software allows the extra memory to be used as a print spooler and/or a RAM disk. RAM disk software for OS-9 Level I is also included.

A New Hybrid: The Cocatari?

Is there a way to connect the port on the CoCo 2 to the port on the Atari 2600 and be able to operate in Atari BASIC?

William Mikrut
Chicago, IL

Rx Even if the hardware interface were worked out, it would do you no good. The Atari uses a 6502 microprocessor while the CoCo uses a 6809E, and they have different machine language instruction sets.

For a quicker response, your questions may also be submitted through RAINBOW's CoCo SIG on Delphi. From the CoCo SIG> prompt, pick Rainbow Magazine Services, then, at the RAINBOW> prompt, type ASK for "Ask the Experts" to arrive at the EXPERTS> prompt, where you can select the "Doctor ASCII" online form which has complete instructions.

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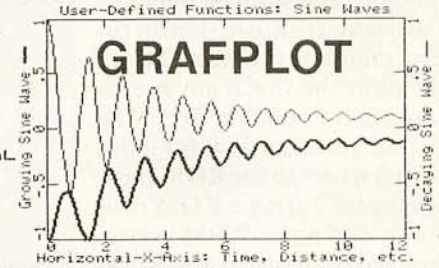

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"I cannot imagine the CoCo 3 without ADOS-3; it would not be a complete machine."
The RAINBOW, July 1987

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A RAM pack for your CoCo ROM port

Static RAM Interface

By Dennis H. Weide

Last spring, while developing a peripheral control system for disabled persons, I ran into one small obstacle. I had to find a way to load, test and modify a program in Program Pak memory addresses $C000 through $FEFF before programming an EPROM chip. So I went to the chalkboard and designed a circuit I thought fit the bill perfectly. It worked so well, in fact, I thought others might find it useful. I call it the Static RAM Interface (SRI for short). It's an excellent hardware project for beginners and, even though it looks complicated, it's easy to build and understand. It works on any version of the CoCo, and I'm sure you'll find scores of uses for it.

Dennis Weide is a communications technician for AT&T in Albuquerque, New Mexico, where he programs AT&T and IBM PCs. He enjoys making toys and teaching programming.

The Solution

It would be nice if we could just hang a few RAM chips on the ROM port and address them in the normal fashion. Unfortunately, there's a problem: Tandy didn't allow the CoCo any means for writing to the ROM port. The CTS lead must go low for both reads and writes to the ROM port. This happens during a ROM read but not during a ROM write. Before we can write to any ROM port memory location, we must find a way to force the CTS lead low during the write cycle.

The solution is simple. Figure 1 is the schematic diagram of a circuit that develops a new CTS lead using address lines A8 through A15. To understand how it works, look at the lowest and highest memory addresses that the ROM port uses and compare them binarily.

Looking at Figure 2, we see the lowest ROM address ($C000) has only bits 15 and 14 set high. Notice that the highest address ($FEFF)

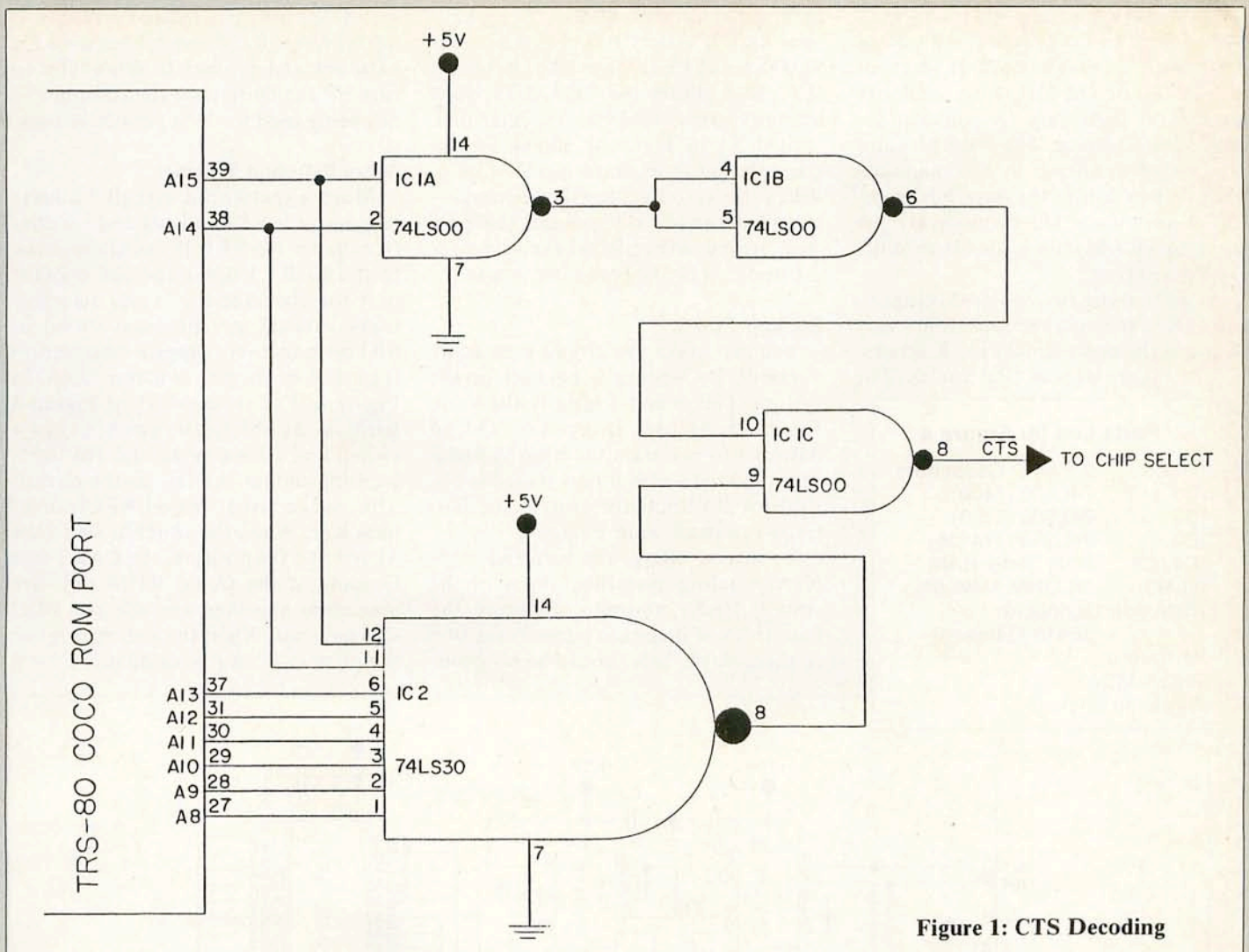

Figure 1: CTS Decoding

also has these same bits set high. Any time we try to access a ROM port address, bits 15 and 14 will be high. In Figure 1, we use these two address bits as inputs to IC1A to select the entire ROM port address range.

In the highest address ($FEFF), Bit 8 is low. We'll use this bit to determine when we're trying to access an address above the ROM port range.

For a better explanation, refer to Figure 1 again. IC1A (74LS00) is a NAND gate used to determine if bits A15 and A14 are both high. IC1B inverts the output of the previous gate (IC1A) so that we'll have the proper signal state when we need it. If either Bit A15 or Bit A14 is low, the output from IC1B will be low. If both bits are high, the output from IC1B will be high. To get the CTS lead low, both inputs to IC1C must be high. We've seen how to do this for the input on Pin 10. Now let's see how the other input works.

IC2 (74LS30) determines the high cutoff address for us. Any low input (A8 through A15) will cause a high output on Pin 8. This high is fed to Pin 9 of IC1C. If Pin 10 of this IC is also high (we've seen how to do this), the CTS output on Pin 8 will go low. If all eight inputs to IC2 go high, the output from it will go low and the CTS lead will go high. So, any time we try to access an address above $FEFF, the CTS lead will go high. This is exactly what we want, because addresses above $FEFF are outside the ROM port address range. Figure 3 is a truth table for the circuit shown in Figure 1.

Now, the Memory

As you can see, the address decoding for the CTS lead is simple. Well, the rest of the circuit is even more simple. All we do is add two static RAM (SRAM) chips (8K by 8-bit each), a high-low address decoder (74LS138) and three resistors and we're done. We use SRAM instead of dynamic RAM (DRAM) because SRAM doesn't require refreshing or address decoding and can be connected directly to the address and data buses.

LO ADDRESS

HEX	C	0	0	0
BIN	1 1 0 0	0 0 0 0	0 0 0 0	0 0 0 0

HI ADDRESS

HEX	F	E	F	F
BIN	1 1 1 1	1 1 1 0	1 1 1 1	1 1 1 1

Figure 2: ROM Port Addresses

A15	A14	74LS30 PIN 8	$\overline{CTS}$
L	L	L	H
L	L	H	H
L	H	L	H
L	H	H	H
H	L	L	H
H	L	H	H
H	H	L	H
H	H	H	L

FOR 74LS30, ANY LEAD IN LO EQUALS HI OUT. ALL LEADS IN HI EQUALS LO OUT.

Figure 3: CTS Truth Table

Figure 4 shows the entire circuit. Notice that the address and data buses are drawn as single lines to prevent cluttering of the drawing, and are labeled on each chip so you can see where they belong. The SRAM chips are labeled as shown by the manufacturer. When wiring the data bus leads, ROM port leads D0 through D7 are wired to SRAM chip leads D1 through D8, respectively.

As we're using two 8K RAM chips to add 16K of memory, we must find a way to access the new memory in 8K blocks. IC3 in Figure 4 does that for us. For memory addresses $C000 to $DFFF (low 8K), it selects IC5. For addresses $E000 to $FEFF (high 8K), it selects IC6. This allows the SRAM to work like any other RAM in the machine. Switch S1 in Figure 4 allows you to select the autoboot feature of the CoCo. When this switch is closed, the computer will automatically execute the program stored in the SRI whenever power is turned on or the computer is reset.

Parts List for Figure 4

C1-C5	0.1 MFD Capacitors
IC1	74LS00 (7400)
IC2	74LS30 (7430)
IC3	74LS138 (74138)
IC4,IC5	2064 Static RAM
R1-R3	1K OHM 1/4W 5%
ROM Port Connector	JE413 (Jameco)
Perfboard	
30 GA. Wire	
Wirewrap Sockets	

Backup Power

You can make this circuit even more versatile by adding a backup power system. The circuit I used is shown in Figure 5. It uses three AA Ni-Cad batteries to maintain the SRAM memory when the CoCo power switch is off. Resistor R4 limits the current the batteries can draw while charging.

Be sure to charge the batteries completely before installing them in the circuit. Under normal conditions, the batteries will maintain memory for two to three days. This should be no problem if you use your CoCo every day. If not, you can install a switch between the batteries and ground to allow you to turn off the batteries if the computer is not being used for long periods of time.

More Bells and Whistles

More experienced circuit builders can add a few more bells and whistles to enhance the SRI. If you connect the Q and CART leads of the CoCo ROM port together, the CoCo will automatically execute any program stored in SRI memory every time the reset button is pushed or the power is turned on. In Figure 6, I've replaced S1 of Figure 4 with a double-pole/double-throw switch and added green and red light-emitting diodes (LEDs) to the circuit. This gives a visual "auto EXEC/norm" indicator. When the switch is set to the AUTOEXEC ON position, the CART and Q leads of the CoCo ROM port are connected together and the red LED will light up. When the switch is set to the AUTOEXEC OFF position, the CART

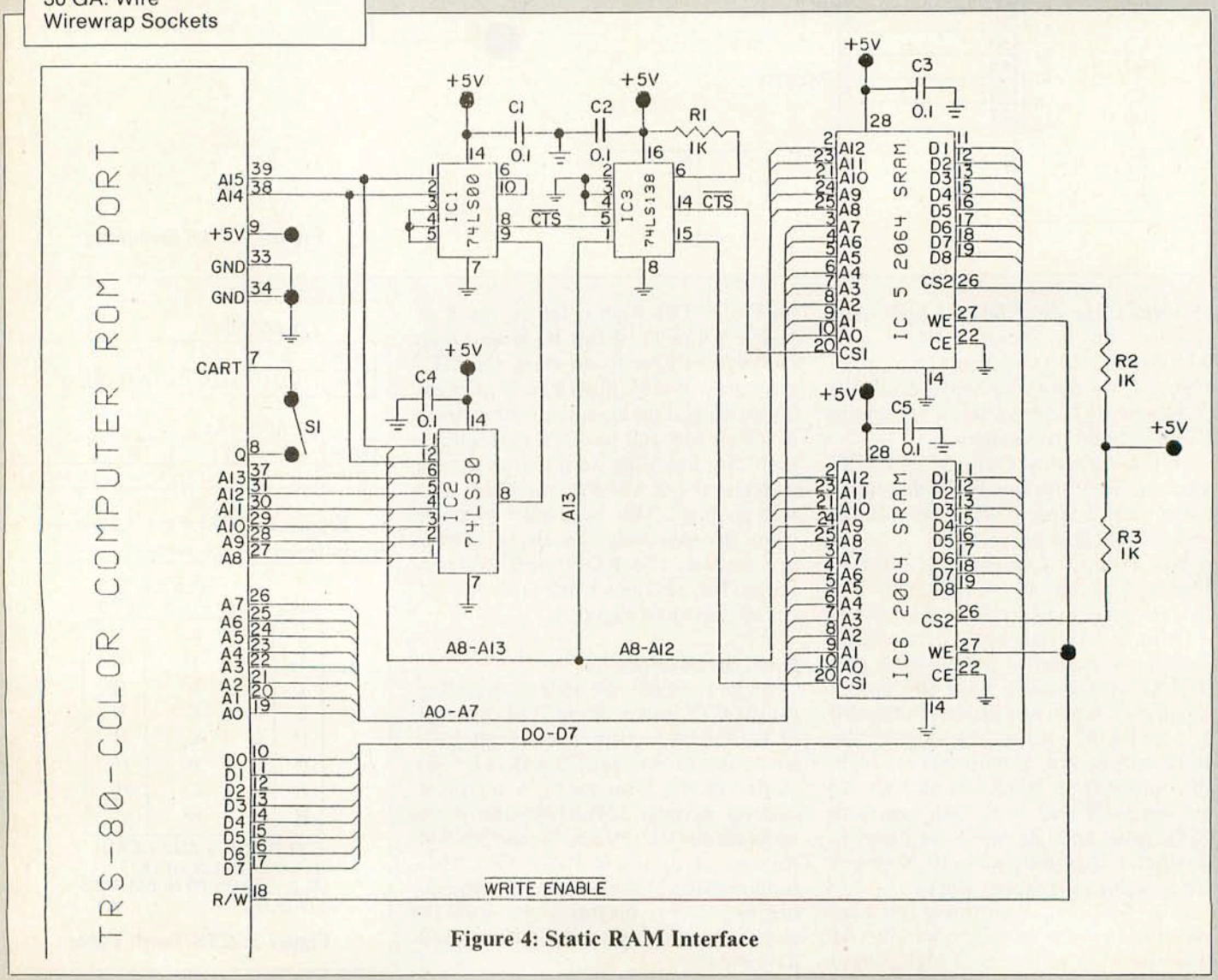

Figure 4: Static RAM Interface

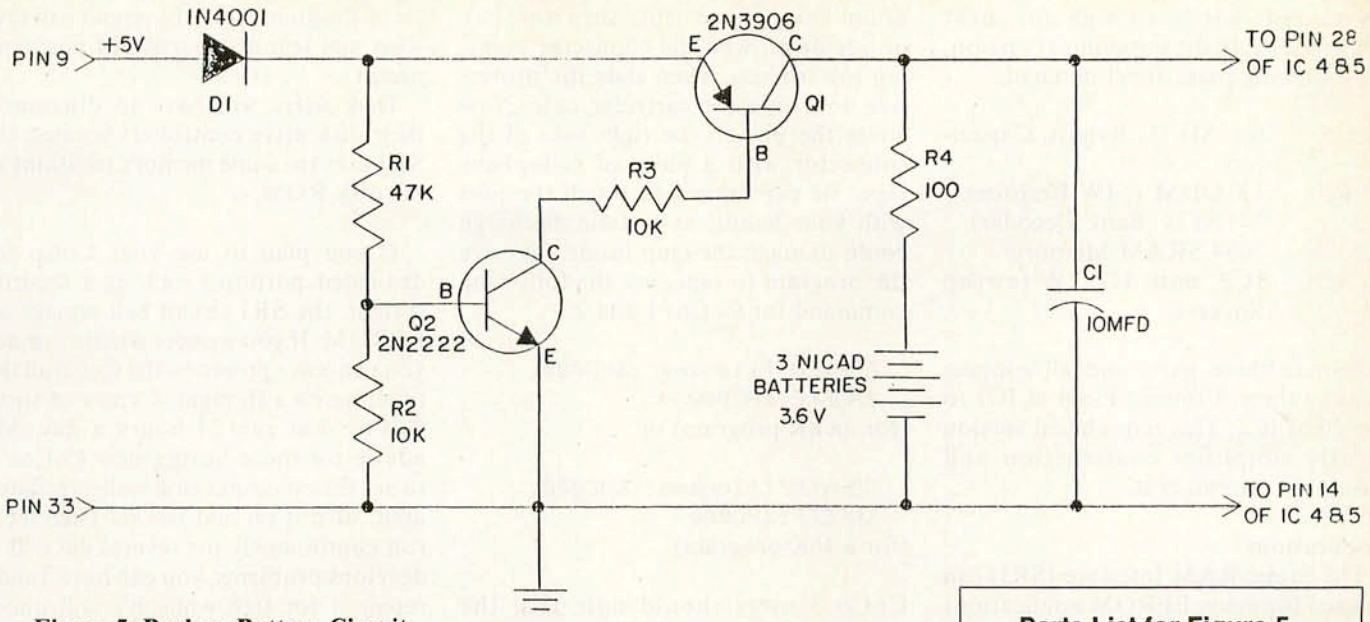

Figure 5: Backup Battery Circuit

Parts List for Figure 5

C1	10MFD 10 Volt Elect
D1	1N4001 Diode
Q1	2N3906 PNP TRANS
Q2	2N2222 NPN TRANS
R1	47K OHMS 1/4W 5%
R2,R3	10K OHMS 1/4W 5%
R4	100 OHMS 1/4W 5%
Nicads	3 "AA" Nicad Cells

Parts are available from your local Radio Shack or from Jameco Electronics, 1355 Shoreway Road, Belmont, CA 94002, (415)592-8097

and Q leads are not connected, and the green LED lights up. Note that to automatically execute a program stored in SRI memory on power-up, you must use a backup battery circuit similar to that in Figure 5. Otherwise, you'll be executing garbage and the computer may lock up. This won't hurt the CoCo, though — it's just convenient.

You can add write protection to the circuit by holding the WE (write enable) lead of IC5 and IC6 high. Figure 7 shows how to add a write protect switch and indicator to the write enable lead of Figure 4. The write enable lead must be low to write to IC5 or IC6. When Switch S2 is set to the WR ENABLE position, the R/$\overline{W}$ lead from the CoCo ROM port is connected directly to the write enable leads of IC5 and IC6, and the red LED lights up. When the switch is set to the WR PROT position, the write enable leads of IC5 and IC6 are permanently held high by the 2.2K ohm resistor, and the green LED lights. This prevents accidentally overwriting any program stored in the SRI memory.

Construction

Construction is not critical, but it can be made easy if you wire wrap. I located one SRI board inside the computer beneath the keyboard. If you decide to do this, plan carefully. There's enough room beneath the keyboard on all versions of the CoCo, but the amount of space varies from version to version. I used a Vector board (#JE413) from Jameco Electronics for the cartridge connector. It will be necessary to cut the pin end to fit the ROM port, because the board is a 44-pin card edge connector; the ROM port uses only 40 pins. Keep all leads as short as possible, and be sure to include capacitors C1 through C5 to prevent switching transients from causing problems. Check all wiring visually *and* with a continuity checker before plugging in to the ROM port or applying power to the circuit. Also, note that opening the CoCo case voids any warranty you may have on the computer.

An Economical Version

For those who want to economize, you can build a cheaper version using

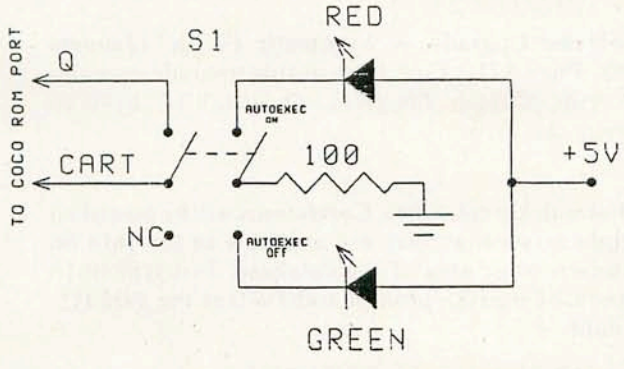

Figure 6: Auto Execute LED Indicator

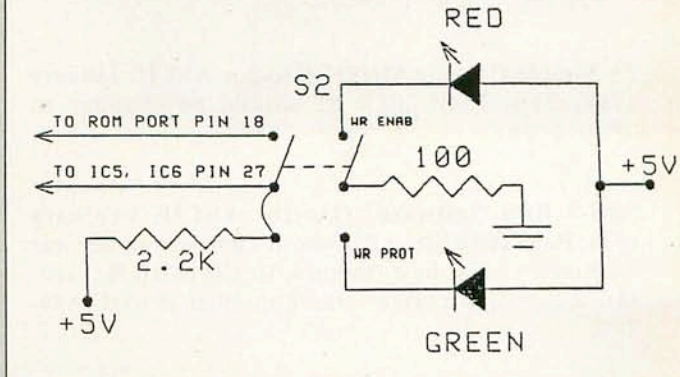

Figure 7: Write Protect LED Indicator

only one SRAM. This will give you an 8K circuit that is enough for most applications. In the economical version, the following parts are eliminated:

C2,C5	0.1 MFD. Bypass Capacitors
R1,R3	1K OHM 1/4W Resistors
IC3	74LS138 (Bank Decoder)
IC5	2064 SRAM Memory
Sockets	IC3 and IC5 Wirewrap Sockets

Eliminate these parts and all connections to them. Connect Pin 8 of IC1 to Pin 20 of IC5. This economical version greatly simplifies construction and lowers the overall cost.

Applications

The Static RAM Interface (SRI) can be used for many EPROM applications in the CoCo 1, 2 and 3. In addition, it can be used to modify programs on Program Paks or other ROMs. I found the SRI so useful that I decided not to build an EPROM programmer after all.

For cassette systems, you can save and load Program Pak programs to and from tape by following these easy steps. First, it's important to disable the automatic execute feature of the Program Pak. To do this, turn the Pak upside down with the connector pointing toward you. Then slide the protective door into the cartridge case. Now cover the pin on the right side of the connector with a piece of cellophane tape. Be careful not to touch the pins with your hands, as a static discharge could damage the chip inside. To save the program to tape, use the following command for CoCos 1 and 2:

```
CSAVEM"filename",&HC000,
&HDFFF,&HC000
```

(for an 8K program) or

```
CSAVEM"filename",&HC000,
&HFEFF,&HC000
```

(for a 16K program).

CoCo 3 users should note that the correct EXEC address for Program Paks in the CoCo 3 is $E010, not $C000.

After you verify the files with the SKIPF command, you can execute them from the SRI memory. First, turn off the computer and plug in the SRI memory board. Turn the power on and set switch 1 to the WRITE position. You can now load the programs saved on tape in the usual method. If you use a lot of Program Paks, the circuit will save wear and tear on your ROM port connector.

Disk users will have to disconnect their disk drive controllers because the SRI uses the same memory locations as the disk ROM.

If you plan to use your CoCo for dedicated purposes such as a security system, the SRI circuit can replace an EPROM. If you wonder whether or not you can leave power on the CoCo all the time, here's a thought. I know of three CoCos that run 24 hours a day. My advice for those buying new CoCos is to set the computer in a well-ventilated area, turn it on and test it. Then let it run continuously for several days. If it develops problems, you can have Tandy repair it for free while it's still under warranty. Once your new CoCo passes the "soak" test, you'll find it's pretty reliable.

(Questions or comments regarding this project may be directed to the author at 14201 Marquette N.E., Albuquerque, NM 87123. Please enclose an SASE if you are writing for a reply.)

Corrections

"*Address* — Computer Address Book" (Review, March 1988, Page 132): The review of *Address* was incorrectly flagged for the CoCo 1, 2 and 3. Actually, *Address* works only on the CoCo 3.

"Disk *EDTASM* on CoCo 3" (Doctor ASCII, January 1988, Page 154): The listing, PATCH, is missing the following line:

```
610 DATA "END","END".
```

"A Simple Cassette Merge" (Doctor ASCII, January 1988, Page 154): OPEN #1 should be changed to OPEN"I",#1.

"OS-9 BBS Software" (Doctor ASCII, February 1988, Page 168): Steve Roberson's phone number was incorrectly listed in a response to Christian B. Lutz. Mr. Roberson's correct phone number is (602) 844-7840.

"Poke Monochrome Fix" (Doctor ASCII, January 1988, Page 154): POKE &HEE066,16 should be changed to POKE &HE066.

"Received and Certified" (April 1988, Page 140): The program listed as *Systems* should be *System 5*. Also, the program requires 512K, *not* 128K, as stated. *ElecSoft, 803d W. 47th Street, Norfolk, VA 23508; 804-451-1255.*

"*Solitaire* Upgrade — Automatic Finish" (January 1988, Page 171): Line 1360 in this upgrade contains an error. Change COL(F,I)=0 to COL(F,1)=0 to correct this error.

For quicker reference, Corrections will be posted on Delphi as soon as they are available in the Info on Rainbow topic area of the database. Just type DATA at the CoCo SIG> prompt and INFO at the TOPIC> prompt.

```
PMODE 4 HPRINT
By:  Douglas Pokorny
Will print any HPRINT font on
the PMODE 4 graphics screen
without a single DRAW statement
High resolution 32x24 screen
with complete I.B.M. Character
set, that may also be used in
HSCREEN 1,2,3 or 4 without
a special driver program
```

Adding the HPRINT Capability to PMODE 4

By Douglas Pokorny

Those of you who have not yet upgraded to a CoCo 3 might feel that your computer is limited in graphics capabilities. Until now, if you wanted to print on the graphics screen, you either had to use a lot of DRAW statements, write a machine language program, or buy a CoCo 3.

I can help change that. The program presented here adds the HPRINT capability to PMODE 4 on any CoCo that has 64K or more memory. My HPRINT subroutine is 10 lines of BASIC code that call font patterns from high memory. These font patterns, strangely enough, come directly from that little area of memory set aside for the HPRINT font. This simply means that any CoCo 3 font you have loaded into memory can be printed on the PMODE 4 graphics screen. Knowing that most CoCo 1 and 2 owners won't have a lot of CoCo 3 fonts lying around handy to load in, I have included one. It is almost a 100 percent look-alike of the very popular font used by PC clones. The only drawback is that it may be a few data lines too long for the average CoCo user to type in.

Douglas Pokorny attends Glenbard South High School in Glen Ellyn, Illinois, where he is a member of the Glenside CoCo Club. He is the co-author of BSE, *a screen editor distributed by Howard Medical Computers.*

Loading the Demo Program

If you are a CoCo 3 user, you simply need to type in the BASIC driver program FONTDEMO and run it; you need not type in the FONTPOKE program. You may wish to load your own font before running this program, or use the data program to create one for you.

If you are using a CoCo 1 or 2, you have a typing lesson ahead. First type in the program FONTDEMO and save it. (If you, for some strange reason, have a CoCo 3 font handy, then skip the next part.) Type in the program FONTPOKE, save and run it. This will create an ML file called IBM.FNT that is used by FONTDEMO. The third program to type is a simple program to transfer ROM to RAM so that you may load in the font IBM.FNT without using any of your cramped program memory. When you have those three programs saved and have run FONTPOKE, you should have four files on your disk. RAINBOW ON DISK users will need to copy the files to a fresh disk *before* running FONTPOKE.

When the cursor reappears, begin by running ROMRAM, and then run the program FONTDEMO. It in turn will load the file IBM.FNT and start printing on the PMODE 4 graphics screen.

Using the Program

The print program works entirely on an x,y coordinate system, much like the CoCo 3's LOCATE command or the HPRINT (X,Y) command. It does not feature true wraparound, so be careful when printing so that your text does not exceed the screen width. To make it compatible with the HPRINT font, I designed the program to use an 8-by-8 pixel block for each character. This means that there is a screen resolution of 32 columns by 24 lines. The only thing that can possibly be limiting is that the character positions, like the text screen, are fixed. For example, you

cannot specify that you would like this character A exactly 25 pixels over from that box drawn over there. Unless that box just happens to be 25 pixels from a character position, you're out of luck. But not totally. After printing your text you can use GET and PUT to move it anywhere. Although it's a more complicated procedure, you will find centering text easier than if you use a pixel-by-pixel or PRINT @ technique.

To use this program you must simply give it the values of three variables and GOSUB to the basic code. The average program will look like this:

```
10 X=0: Y=5: A$="I really
like PMODE 4 HPRINT!!"
20 GOSUB 10000
10000 'HPRINT ROUTINE
-Subroutine program-
10010 RETURN
```

In this program, you set the x and y coordinates as X= x location, Y= y location, and A$="Text to print" followed by a GOSUB 10000, the location of FONTDEMO's "HPRINT" code. Use the same subroutine in your program where you want to print. After printing the message, it will return to where you left off in your program. The parameters are: X= 0 to 31 for 32 columns and Y= 0 to 23 for 24 rows, and A$= any printable text characters from CHR$(32) to CHR$(127). This consists of all alphabetic characters, all numbers, punctuation, special characters, and the following not normally producible in Extended Color BASIC on the CoCo 2: A single "back quote" (looks like an apostrophe (') but is reversed), curly braces ({ and }), and an underline character (like the one used as the width 40/80 cursor).

The following are for use in *Telewriter-80* (Cognitec & Doug Masten): An end-of-text file marker (a diagonally striped square), a carriage return (an arrow pointing down and to the left) and an underline delimiter (a double underline).

Additional Programming Tips

The program is preset to print black characters on a white background in SCREEN 1,1 and black characters on green in SCREEN 1,0. This is actually the *inverse* of what would normally be printed. BASIC is set up to print green or white characters on a black background, but I found that black on white or green looks better on my monitor. To change from this inverse mode to normal, simply find the line in the subroutine with the POKE command in it. It looks something like this:

```
POKE A+32*D,255-PEEK
(&HF09D+C+D).
```

Change it to:

```
POKE A+32*D,PEEK(&HF09D+C+D).
```

If you own a CoCo 3, there is a scientific character set available with no extra typing. In the line mentioned above, change the PEEK location to &HFA0F and a new, previously "hidden" character set will be displayed in place of the regular font. The new font consists of scientific, alternative language, and graphics blocks. This feature is not offered to CoCo 2 users. I don't know why this font isn't offered in BASIC, but it's there for your use.

ROM/RAM

As you know, the CoCo 3 does an automatic ROM/RAM on power-up. The CoCo 1 and 2 do not feature this, because this program uses space above &H7FFF. CoCo 1 and 2 users must first run the ROMRAM utility shown in Listing 3 to put the machine in the 64K mode and allow changes to ROM.

(Questions or comments regarding these programs may be addressed to the author at 932 Oakwood Ct., Glen Ellyn, IL 60137. Please enclose an SASE when requesting a reply.) □

Listing 1: FONTDEMO

```
10 ' A BASIC ROUTINE TO USE
     HPRINT FONTS IN WIDTH 32
20 LOADM"IBM.FNT"
30 PMODE4,1:SCREEN1,1:PCLS1
40 X=9:Y=0:A$="PMODE 4 HPRINT"
50 GOSUB 10000
60 X=6:Y=1:A$="By:  Douglas Poko
rny"
70 GOSUB 10000
80 X=1:Y=3:A$="Will print any HP
RINT font on"
90 GOSUB 10000
100 X=2:Y=5:A$="the PMODE 4 grap
hics screen"
110 GOSUB 10000
120 X=0:Y=7:A$="without a single
 DRAW statement"
130 GOSUB 10000
140 X=2:Y=9:A$="High resolution
32x24 screen"
150 GOSUB 10000
160 X=1:Y=11:A$="with complete I
.B.M. Character"
170 GOSUB10000
180 X=1:Y=13:A$="set, that may a
lso be used in"
190 GOSUB 10000
200 X=3:Y=15:A$="HSCREEN 1,2,3 o
r 4 without"
210 GOSUB 10000
220 X=4:Y=17:A$="a special drive
r program"
230 GOSUB 10000
240 GOTO 240
10000 IF X<0 OR X>31 OR Y<0 OR Y
>23 THEN PRINT"?FC ERROR":END
10001 A=256*Y+X+3584
10002 FOR B=1 TO LEN(A$)
10003 B$=MID$(A$,B,1)
10004 C=(ASC(B$)-32)*8
10005 FOR D=0 TO 7
10006 POKE A+32*D,255-PEEK(&HF09
D+C+D)
10007 NEXT D
10008 A=A+1
10009 NEXT B
10010 RETURN
```

Listing 2: FONTPOKE

```
10 DATA 0,0,0,0,0,0,0,0
20 DATA 30,78,78,30,30,0,30,0
30 DATA 6C,6C,6C,0,0,0,0,0
40 DATA 6C,6C,FE,6C,FE,6C,6C,0
50 DATA 30,7C,C0,78,C,F8,30,0
60 DATA 0,C6,CC,18,30,66,C6,0
70 DATA 38,6C,38,76,DC,CC,76,0
80 DATA 30,30,60,0,0,0,0,0
90 DATA 18,30,60,60,60,30,18,0
100 DATA 60,30,18,18,18,30,60,0
110 DATA 0,66,3C,FF,3C,66,0,0
120 DATA 0,30,30,FC,30,30,0,0
130 DATA 0,0,0,0,0,30,30,60
140 DATA 0,0,0,FF,0,0,0,0
150 DATA 0,0,0,0,0,30,30,0
160 DATA 6,C,18,30,60,C0,80,0
170 DATA 7C,C6,CE,DE,F6,E6,7C,0
180 DATA 30,70,30,30,30,30,78,0
190 DATA 78,CC,C,38,60,C4,FC,0
200 DATA 78,CC,C,18,C,CC,78,0
210 DATA 1C,3C,6C,CC,FE,C,1E,0
220 DATA FC,C0,F8,C,C,CC,78,0
230 DATA 38,60,C0,F8,CC,CC,78,0
240 DATA FC,CC,C,18,30,30,30,0
250 DATA 78,CC,CC,78,CC,CC,78,0
260 DATA 78,CC,CC,7C,C,18,70,0
270 DATA 0,30,30,0,0,30,30,0
280 DATA 0,30,30,0,0,30,30,60
290 DATA 18,30,60,C0,60,30,18,0
300 DATA 0,0,FE,0,0,FE,0,0
310 DATA 30,18,C,6,C,18,30,0
320 DATA 78,CC,C,18,30,0,30,0
330 DATA 7C,C6,CE,DA,CE,C0,7E,0
340 DATA 30,78,CC,CC,FC,CC,CC,0
350 DATA FC,66,66,7C,66,66,FC,0
360 DATA 3C,66,C0,C0,C0,66,3C,0
370 DATA F8,6C,66,66,66,6C,F8,0
380 DATA FE,62,68,78,68,62,FE,0
390 DATA FE,62,68,78,68,60,F0,0
400 DATA 3C,66,C0,C0,CE,66,3E,0
410 DATA CC,CC,CC,FC,CC,CC,CC,0
420 DATA 78,30,30,30,30,30,78,0
430 DATA 1E,C,C,C,CC,CC,78,0
440 DATA E6,66,6C,78,6C,66,E6,0
450 DATA F0,60,60,60,62,66,FE,0
460 DATA C6,EE,FE,FE,D6,C6,C6,0
470 DATA C6,E6,F6,DE,CE,C6,C6,0
480 DATA 38,6C,C6,C6,C6,6C,38,0
490 DATA FC,66,66,7C,60,60,F0,0
500 DATA 78,CC,CC,CC,CC,DC,78,1C
510 DATA FC,66,66,7C,6C,66,E6,0
520 DATA 78,CC,E0,78,1C,CC,78,0
530 DATA FC,B4,30,30,30,30,78,0
540 DATA CC,CC,CC,CC,CC,CC,78,0
550 DATA CC,CC,CC,CC,CC,78,30,0
560 DATA C6,C6,C6,D6,FE,EE,C6,0
570 DATA C6,C6,6C,38,38,6C,C6,0
580 DATA CC,CC,CC,78,30,30,78,0
590 DATA FE,C6,8C,18,32,66,FE,0
600 DATA 78,60,60,60,60,60,78,0
610 DATA C0,60,30,18,C,6,2,0
620 DATA 78,18,18,18,18,18,78,0
630 DATA 10,38,6C,C6,0,0,0,0
640 DATA 0,0,0,0,0,0,0,FF
650 DATA 30,30,18,0,0,0,0,0
660 DATA 0,0,78,C,7C,CC,76,0
670 DATA E0,60,60,7C,66,66,DC,0
680 DATA 0,0,78,CC,C0,CC,78,0
690 DATA 1C,C,C,7C,CC,CC,76,0
700 DATA 0,0,78,CC,FC,C0,78,0
710 DATA 38,6C,60,F0,60,60,F0,0
720 DATA 0,0,76,CC,CC,7C,C,F8
730 DATA E0,60,6C,76,66,66,E6,0
740 DATA 30,0,70,30,30,30,78,0
750 DATA C,0,C,C,C,CC,CC,78
760 DATA E0,60,66,6C,78,6C,E6,0
770 DATA 70,30,30,30,30,30,78,0
780 DATA 0,0,CC,FE,FE,D6,C6,0
790 DATA 0,0,F8,CC,CC,CC,CC,0
800 DATA 0,0,78,CC,CC,CC,78,0
810 DATA 0,0,FC,66,66,7C,60,F0
820 DATA 0,0,76,CC,CC,7C,C,1E
830 DATA 0,0,DC,76,66,60,F0,0
840 DATA 0,0,7C,C0,78,C,F8,0
850 DATA 10,30,7C,30,30,34,18,0
860 DATA 0,0,CC,CC,CC,CC,76,0
870 DATA 0,0,CC,CC,CC,78,30,0
880 DATA 0,0,C6,D6,FE,FE,6C,0
890 DATA 0,0,C6,6C,38,6C,C6,0
900 DATA 0,0,CC,CC,CC,7C,C,F8
910 DATA 0,0,FC,18,30,60,FC,0
920 DATA C,18,18,30,18,18,C,0
930 DATA 66,33,99,CC,66,33,99,CC
940 DATA 30,18,18,C,18,18,30,0
950 DATA 6,26,66,FE,FE,60,20,0
960 DATA 0,0,0,0,0,7E,7E,0
970 FOR X=&HF09D TO &HF396
980 READ A$
990 A=VAL("&H"+A$)
1000 POKE X,A
1010 NEXT X
1020 SAVEM"IBM.FNT",&HF09D,&HF39
6,0
```

Listing 3: ROMRAM

```
10 'ROMRAM 8/85 RAINBOW
20 CLEAR 999
30 DATA 26,80,190,128,0,183,255,
222,166,128
40 DATA 183,255,223,167,31,140,2
24,0,37,241,57
50 FOR I=1TO21:READA:A$=A$+CHR$(
A):NEXT I
60 P=VARPTR(A$)+1
70 POKE P,126
80 EXEC P
90 PRINT "BASIC IS NOW IN RAM"
```

In this and in future "CoCo Consultations," I will be trying something new. In addition to the familiar Q & A column, I will also include tidbits of information contributed by various folks and, in some cases, comment on the information. Thus, even if you don't have a question, *I invite you to send in any little hints or descriptions of experiences you have had with the CoCo that you think might be of interest to the CoCo-owning public in general.*

Just what the Doctor ordered

For All the ROM Reasons

By Marty Goodman
Rainbow Contributing Editor

I have a disk controller that provides for two different disk ROMs, with a switch to toggle between them. I have a ROM in one socket and none in the other. What would happen if I were to switch to the blank socket while the power is on? What would happen if I had a second disk ROM of some kind in the other socket, and then made the switch?

Andrew James
(ANDREWJAMES)
Nashua, NH

The result would be different in either case depending on whether you have a CoCo 3 or a CoCo 1 or 2. With the CoCo 3, the contents of the disk ROM is moved into RAM and then patched at the instant of power up. After that, the CoCo 3 runs entirely out of RAM memory. It never again looks at the ROM in normal BASIC operation, nor during the operation of many (though not all) commercial programs for the CoCo. Thus, on a CoCo 3, making the switch to another socket should make no difference whatsoever after the first second or so of power up. Note that the ROM is recopied if you do a full cold start (hold down CTRL and ALT keys, press reset, then press reset again). If you switched to a blank socket, then did a full cold start, your computer would come up with Extended Color BASIC, for it would have lost sight of the disk ROM during the cold start/power up process.

On a CoCo 1 or 2, the situation is a bit different. CoCos 1 and 2 normally "run out of ROM" all the time and thus are constantly executing code that resides in the ROM. In particular, there is an "interrupt routine" in Disk BASIC that is executed 60 times a second. If you switch to a blank ROM socket on such a machine, the computer will immediately crash because you have "pulled the rug out from under" its operating code. That is, you will have removed from its "sight" the code it needs to execute 60 times a second.

If you have a different disk ROM in the second socket, things get a bit more complex and subtle. The results depend on three things: the similarity of the two disk ROMs, the physical properties of the switch on the controller, and exactly when you switch it. Two fundamentally similar ROMs, such as Disk BASIC 1.0 and ADOS 2, usually can be switched during normal BASIC operation with no problem. However, about one time in 10, making that switch causes the computer to lock up: This happens if you manage to be turning the switch at the exact time the interrupt code is being executed, when the switch is between positions during the execution of that code. This results in a situation similar to the one above of switching to a blank ROM socket. In general, though, it is a poor idea to switch between disk ROMs while the computer is in BASIC or when it's executing other code. You should always turn the power off (or, on a CoCo 3, do a full cold start as described above) after switching ROMs.

Martin H. Goodman, M.D., a physician trained in anesthesiology, is a longtime electronics tinkerer and outspoken commentator — sort of the Howard Cosell of the CoCo world. On Delphi, Marty is the SIGop of RAINBOW's CoCo SIG and database manager of OS-9 Online. His non-computer passions include running, mountaineering and outdoor photography. Marty lives in San Pablo, California.

VIP Speller on the CoCo 3

Is there a patch for VIP Speller *to make it work on the CoCo 3?*

Paul McCay
(PAULMCCAY)
Manchester, NH

Because there were many different versions of the *VIP* products released, it is rather difficult for anyone to write a patch that works for all versions. I know of no such patch in the public domain. But S&D Enterprises (P.O. Box 1233, Gresham, OR 97030) is currently selling a CoCo 3 compatible version of *VIP Speller* for $35. For $80 they have listed *VIP Writer III*, a version of *VIP Writer* that utilizes the full 80-column text screen capabilities of the CoCo 3.

Clean Screen

I bought a used Amdek monochrome monitor, the screen of which seemed marred, as if it were scratched. I noticed there was an anti-glare screen up against the picture tube. Despite your warning to me on Delphi about the dangers of messing with this arrangement, I took the monitor apart, and found that the anti-glare screen easily came off the picture tube. The defect turned out to be a buildup of dirt between the anti-glare mesh and the picture tube itself. I washed both the anti-glare mesh and the picture tube using warm, soapy water, rinsed them with water, then put it all back together. The result: My monitor now looks like new, and the blemish is completely gone.

Alex Volpe
(NIGHTAL)
Plymouth Meeting, PA

Thanks much, Alex, for that tip. Amdek 300 series monitors have one of the finest, most glare-free images I've

ever seen. Not everyone has your luck with used monitors, though. Sometimes the problems can be more severe. The anti-glare mesh itself can be *torn*. In such cases, repair is more difficult, though it may be possible to order a replacement anti-glare mesh from Amdek. Note that the Amdek 300 series uses a monochrome composite video input (compatible with CoCo 3), but the Amdek 310 series uses a TTL monochrome input (for use only with IBM monochrome systems).

Vestigial Remains

I noticed that Pin 10 on the CoCo 3's RGB connector is pulled to +5 volts through a 4.7K ohm resistor and also runs to Pin 13 of the 68B21 PIA (Bit 3 of $FF22). What function is this pin supposed to serve? Does shorting that pin to ground cause the CoCo 3 to recognize the presence of the RGB monitor and reset the palette accordingly, or set to 80-column width, or what?

Paul Pollock
(PAULBELL)
Sepulveda, CA

You have discovered a "vestigial" feature on the CoCo 3, which is *not* documented and is *not* officially used. There is *no* code in BASIC, OS-9 or any commercial software I know of that looks for the status of that PIA port bit. My *speculation* is that at one stage of CoCo 3's design, the design team, as you guessed, considered putting a hardware indicator that could be tied to ground to show the presence of an RGB monitor on that 10-pin port.

Fortunately (in my opinion), they abandoned that idea. It would have been a mistake, for many users (like myself) use both monochrome and RGB monitors (or both RGB and composite color video monitors) on their CoCo 3s at the same time. If software were to automatically set up for RGB palette any time it saw a plug in the RGB connector, folks like us might be greatly inconvenienced. It seems, however, that they abandoned the idea *after* the printed circuit board for the CoCo 3 had been laid out, or possibly after it was already in production. So the hardware provision for such a feature remained, despite the decision to abandon software support for this feature.

Note that even Tandy's CM8 does not pull Pin 10 to ground. It simply does not use that line, which is probably the most compelling evidence of all that Tandy itself has decided not to use that provision.

To this day, Pin 10 of the CoCo 3 RGB video connector provides a single-bit input to the PIA port at $FF22, which is normally tied high. Die-hard hackers might find some use or other for that input. For me, the most sensible use for Pin 10 is to disconnect it from its current circuit (by removing R61 and R62, both 4.7K resistors located near the 68B21 PIA) on the board. Then hook either 5 volts or a combined negative sync to that pin to allow the RGB port to be used more flexibly with other brands of RGB analog monitors.

Combined negative sync can easily be generated using a 74LS02 chip you can piggy-back onto the 74LS04 that is currently used as a sync buffer for the separate H and V sync. Putting that on Pin 10 will make it trivial to use the CoCo 3 with Sony and Amiga-type RGB analog monitors, providing there is a proper cable; having +5 volts on Pin 10 means you can put the needed sync combiner and inverter circuitry easily into the cable, allowing even greater flexibility, though causing greater complexity of cable design.

Vertical Resolution

Is there any hardware modification — of any complexity — that allows more vertical lines and/or allows for the use of interlace (as on the Amiga) on the Color Computer 3? Does the upgraded GIME chip support more vertical lines per inch than the old one, even if only in monochrome?

Christopher M. Webster
Shermansdale, PA

The answer to all your questions is one big no. The CoCo was designed around monitors that accept horizontal scan frequencies of 15.75 KHz. This limits it to 200 to 225 lines of vertical resolution. To get more than that would require the use of multiscan monitors, which cost about $1,000 when the CoCo 3 was being designed, and still cost in excess of $500 today. It would have been sheer madness on any designer's part to make a $200 computer that required a $1,000 monitor to get full graphics display! Even if hardware support for such a monitor had been provided, no software developer in his right mind would consider taking the time to write software for it, considering how few CoCo owners would be buying one.

The new GIME chip is basically the same as the old one, with a few very minor bugs corrected. As for interlace, again, no. There is no way to modify the CoCo to use that, short of completely rebuilding and redesigning the computer pretty much from the ground up.

If you want greater vertical resolution, I suggest you look into the Macintosh II or a Sun workstation. You might also consider an 80386 MS-DOS/OS2 machine with VGA adapter. Any of these systems will set you back $5,000 to $20,000, depending on configuration. The Amiga, which uses interlace in its highest vertical resolution mode, suffers from flicker problems. Indeed, most color graphics programs for it wisely elect to use no more than 200 to 225 lines of vertical resolution, turning off the interlace feature to avoid this problem.

BASIC Enhancements

Can the CoCo 3 be made to power up to a 40-column screen?

See pg 149

John N. Lim, Jr.
(NAHALEA)
Mililani, HI

Yes. By using ADOS-3, you can configure and burn an alternate DOS EPROM that will cause the CoCo 3 to power up in 40 or 80 columns in any color set you choose. ADOS-3 also enhances BASIC in many other ways, including adding a full-screen editor and fixing BASIC for proper disk operation at double speed. I highly recommend it. It is available from Spectro-Systems. When you buy the product you get a *software* product, which, for an additional fee, you may send out to have burned into an EPROM.

Your technical questions are welcomed. Please address them to CoCo Consultations, THE RAINBOW, P.O. Box 385, Prospect, KY 40059.

We reserve the right to publish only questions of general interest and to edit for brevity and clarity. Due to the large volume of mail we receive, we are unable to answer letters individually.

Questions can also be sent to Marty through the Delphi CoCo SIG. From the CoCo SIG> prompt, pick Rainbow Magazine Services, then, at the RAINBOW> prompt, type ASK (for Ask the Experts) to arrive at the EXPERTS> prompt, where you can select the "CoCo Consultations" online form which has complete instructions.

What's in a file?

Files and Protocols

By Cray Augsburg
Rainbow Technical Editor

Last month we took a brief excursion into terminal software choices. We also hit lightly on how the CoCo SIG database areas are organized. Finally, we took a look at the various filename extensions used in the databases. So, we're all set to download! Or are we?

Files

Before we actually go into the SIG and begin downloading, we should take a moment to learn a little about files. Just what is a file? A file is a collection of related characters, or bytes, that are combined to form some meaning. A particular file might be a program. It could also be an article (text file) or even data for a program. Each byte in a file can take on a value from 0 to 255, inclusive. This is because the eight bits that form a byte can be used to form 256 different combinations.

In days past, only seven of the eight bits in each byte were used to form a character. Seven bits can form 128 different combinations. You may be familiar with the term ASCII, which stands for American Standard Code for Information Interchange; this is a code that uses only seven bits from each byte. For our purposes, the eighth bit is meaningless. This means that in an ASCII file, each byte takes on a value from 0 to 127 inclusive. Each byte can be used to represent one of 128 different characters. The ASCII code allows the use of all upper- and lowercase alphabetic characters, the numbers 0 through 9, punctuation and some common "control characters" such as carriage return and line feed.

A text file generated with a word processor is a current example of an ASCII file. Most word processing programs store files in ASCII format or at least have the ability to do so. BASIC programs can be saved in ASCII format on the CoCo, as well. We simply follow the filename with ,A when saving. If this isn't done, the file will be saved in what is called binary format.

A binary file is one in which all eight bits are used in each byte. This allows the file to contain control codes and graphics information. It also allows the storage of machine language information, since values used in machine language range from 0 to 255.

Some use the terms "compressed" or "tokenized" when referring to BASIC programs saved in binary format. This is because, unless you use the ASCII option (,A), the BASIC keywords (e.g. PRINT, INPUT, GOSUB, etc.) are not stored as a collection of characters forming that keyword. Instead, BASIC converts each group of characters forming a keyword into a binary value called a token. Each token is a one-byte value. So, the keyword PRINT takes up only one byte instead of five when it is stored. The resultant savings is most obvious on larger BASIC programs stored on disk. Try saving a long BASIC program to disk in ASCII format. Then save it in tokenized format. Compare the amount of disk space used to store each save.

Now that we have an idea about the differences between ASCII and binary, how is that information useful to us? This little bit of information often dictates what methods we use to download a file. One of the main reasons for standardizing filename extensions in the databases was to allow users to have information regarding the filetype before initiating a download. It is also very important when it is time to save that downloaded file.

Protocols

Several methods are available to us for downloading files from online information services. The two basic categories are non-error-checking and error-

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Database Report

By Don Hutchison
Rainbow CoCo SIG Database Manager

First off, let me remind you that RAINBOW ON TAPE and RAINBOW ON DISK programs are available online on the Rainbow CoCo SIG and OS-9 Online. These are the same programs and files that are published monthly in the pages of THE RAINBOW.

We publish the programs online each month at about the same time that you receive your copy of THE RAINBOW, so you won't have to wait to download the ones you want. The ordinary BASIC programs are available in the database of the CoCo SIG, while the OS-9 files are available in the database of OS-9 Online. Just type DATA RAINBOW in either SIG to get to these files. Now let's look at the new uploads for this month!

OS-9 Online

In the General topic of the database, **Christopher Burke** (COCOXT) uploaded Burke & Burke Application Note #3. **Denny Skala** (DENNYSKALA) posted a review of *Stylograph*. **Jim Johnson** (REINDEER) provided a very popular file containing a detailed description of how to build an OS-9 Level II system disk that boots up into an 80-column device window and also creates a VDG screen for use with Level I programs. (Jim also provided a hint in the file on how to run *Koronis Rift* on a VDG screen other than /TERM.)

In the Programmers Den topic of the database, **Bruce Terry** (THEMAGE) uploaded his *Hordes and Holes* game. In the Applications topic of the database, **Dick White** (DICKWHITE) uploaded the Federal Income Tax form 1040 as a *DynaCalc* spreadsheet for the tax year 1987. (This spreadsheet should also be usable under the RS-DOS version of *DynaCalc*.) **Alan**

checking. Common examples would be the buffer capture method and Xmodem, respectively. Since these are the most common methods used with the Color Computer, they will be the only methods discussed here.

Without going into great detail, suffice it to say you should use the buffer capture method only when dealing with an ASCII file, be it a BASIC program or a text file. During buffer capture each byte is sent as a totally separate entity. The received byte is stored in your computer's memory without regard to its value. And, because of problems with noise on the phone lines, there is no guarantee that the byte sent from the host is the same as that received by your computer. A file downloaded with this method may contain several incorrect characters. Editing an ASCII text file downloaded via this method is painful enough; trying to edit a machine language file under these conditions is impossible. For this reason, if you want to download a file that has been stored in binary format, use an error-checking protocol such as Xmodem.

In an Xmodem download, the information in the file is grouped into blocks of 128 bytes each. Actually, the size of the block is larger than that, but the file content in the block is 128 bytes. The other bytes in the block are used to check that block for errors. If no error is encountered in a given Xmodem block, the sending computer is notified; it will move on and send the next block. However, if an error is found, the receiving computer will ask the sending computer to send the same block again. This is known as a "retry." Generally, the two computers will allow up to 10 retries. After that, the download is aborted. This process continues until either the file is transferred or the process is aborted. The advantage of using Xmodem is that it can be used to download any type of file reliably. This is why you are urged to purchase a terminal program that supports this, if not some other type of error-checking file transfer protocol.

Moving On . . .

As I indicated last month, the CoCo SIG database is divided into 16 different topic areas, 14 of which are user-accessible. These topic areas are as follows:

General Information
CoCo 3 Graphics
Source for 6809 Assemblers
Utilities & Applications
Hardware Hacking
Games
Classic Graphics
Music & Sound
Info on Rainbow
Archives
HELP
Product Reviews & Announcements
Rainbow On Tape
Data Communications

For our purposes, it may be easier to view the database as 14 different databases. Another visualization aid is the file cabinet. Imagine the database as a 14-drawer file cabinet and each drawer as being one of the 14 database topic areas. When you type DAT at the CoCo SIG prompt, you are asked for a topic. Delphi is just asking which drawer you want to look through. Pick one and Delphi will put you there — it will open that drawer for you. In picking a topic area, you need enter just the first three characters of that area to make your entry unique. Just as with other prompts on Delphi, abbreviations work fine here.

When the drawer is first opened, you will find yourself at the "top" of the chosen database. For instance, if you choose the Music & Sound topic at the TOPIC>? prompt, you will see the DBASES:Mus> prompt appear on the screen. You are now ready to look through the file drawer and see what's there. For instructions on this, I refer you to last month's Delphi Bureau.

Because of its design, the file cabinet is somewhat precariously balanced. You can have only one drawer open at any one point in time. Otherwise, the file cabinet would fall over. In other words, you can't be in two different topic areas at the same time. Not to worry, though. Delphi will take care of this for you. And you can switch drawers quite easily. This is done with the SET command. The SET command can be en-

Sheltra (PHDRAGON) provided CCDEX.B09, a Rolodex-type program for names and addresses. **Pat Abramovitch** (HUBBS) posted the source code for his CHECK09 program.

In the Utilities topic of the database, **Pete Lyall** (OS9UGVP) provided MORE.AR, a MORE-like program similar to that provided under UNIX. Bruce Terry uploaded LISTER.AR, a text file listing utility with pagination and header options.

In the Device Drivers topic of the database, **Karl McMurdo** (XRX23) posted PPRINT.AR, which contains a driver and device descriptor for the parallel port described in the November and December '87 issues of THE RAINBOW. **Alan Parker** (ALPARKER) uploaded a printer driver to be used with the Star SG10 printer and Tandy's *Home Publisher.*

In the Patches topic of the database, **Dave Philipsen** (DPHILIPSEN) posted COPYPATCH.AR, an IPatch file, and documentation to patch the OS-9 Level II Copy command to overwrite existing files. If an existing file has been selected as the destination file, the patched Copy command will ask if it should be overwritten.

Jason Forbes (COCO3KID) uploaded GAMEPATCHES.AR, an Ipatch file that contains a series of patches that will fix *Koronis Rift* and *Rescue on Fractalus.* **Dave Archer** (DAVEARCHER) provided FIXRX, a patch that allows the Epson printer driver (prn.EpsonRX) to be used with a Gemini 10X printer. **Ken Scales** (KSCALES) uploaded KEYTAB03, a set of patches to CC3IO to provide alternate mapping for the non-alpha key codes, allowing the arrow and function keys to be used more easily under *DynaStar.* The two key maps may be toggled independently on a per-window basis.

In the Telecommunications topic of the database, **Bill Brady** (OS9UGED) uploaded XMac, an Xmodem fileserver. XMac is the missing ingredient that you need to make OS-9 a BBS in its own right. XMac allows a user logged on to your system to transfer files in the Xmodem protocol. Bill also provided WIXMOD.I, a replacement Xmodem module for *The Wiz.* This new version is much faster than the original, and fixes two problems. **Merle Kemmerly III** (TOOK3) provided C functions that allow you to transmit files via Xmodem protocol. **Warren Hrach** (WAROCK) posted DYNALOG, a BASIC09 procedure for converting *Wiz* autolog files to *DynaCalc* files.

In the Graphics & Music topic of the database, **Rick Adams** (RICKADAMS) uploaded three of his favorite shell scripts for setting up one, two or three windows in OS-9 Level II. They create the windows, initiate the fonts, set up the proper color sets, head up each window with a neat-looking label, and then start the shells. **Michael Washburn** (COMPZAP) posted a modpatch file for using *Home Publisher* with Gemini 10x printers. **Jimmy Lemke** (JIMLEM50) uploaded a *Star Trek* game. **Brian Stretch** (BRIANSTRETCH) posted SHELICON.AR, a nice, simple 80-by-24 icon to replace the "cute" window created by Gshell under *Multi-Vue.* Dave Archer uploaded MAC, an ARCed file containing a scrolling Macintosh picture viewer, a Gemini 10X printer dump for the picture, and associated documentation.

CoCo SIG

In the General topic of the database, **Mike Andrews** (MANDREWS) provided a very interesting and detailed listing of

tered at either the DBASES> prompt (top of the database) or the ACTION> prompt (discussed last month). Just enter SET, followed by the first three characters of the new topic area. For instance, we are now in the Music & Sound database. To change drawers and go to the CoCo 3 Graphics database, enter SET COC and you're there!

To complete the file cabinet scenario, let's take a look at groups. The CoCo SIG is the filing cabinet, and the drawers are the individual databases or topic areas. Each folder in a given drawer represents a group. On Delphi, a group is a collection of one or more files. Note that a group might have just one file in it. When you type DIR (or just press ENTER) at the DBASES> prompt, the directory you see is actually a list of the group names, or folders, within that database, or drawer.

Before you can download from a group, you must open that group by reading it. This is done by typing READ, followed by the name of the group as it appeared in the directory. Again, abbreviations work here. The only rule is that you must enter enough characters to make your entry unique so Delphi knows exactly which group you want to look at.

"A binary file is one in which all eight bits are used in each byte. This allows the file to contain control codes and graphics information."

When you have opened the group by reading it, you will then see a brief description of the group along with the name(s) of any file(s) it contains. To continue with the filing cabinet metaphor, liken each file to a piece of paper within the chosen folder.

Short of actual downloading procedures, you are armed with enough information to really get going. I urge you to log on and take a look around the databases. See what's there. If you are adventurous, try downloading. Experience is the best teacher. If you really get things fouled up, just turn your modem off, get back online and try again. For those who are more faint of heart, we'll take a look at actual downloading next month. □

"smilies," the text/art "faces" that are so popular in Mail and Conference. I (DONHUTCHISON) provided a humorous file called "Tenne-C," which is a mock product announcement for a new C compiler.

In the CoCo 3 Graphics topic area, **Donald Ricketts** (STEVEPDX) was this month's most active uploader, providing us with over 130 digitized images and conversions! Most of these are digitized images that have been converted to *CoCo Max III* format. Thanks, Donald! **Richard Trasborg** (TRAS) sent us LCG.MGE, a graphics advertisement (drawn by Mike Trammell) for a Staten Island BBS that specializes in graphics. In response to a SIG member's request, Richard also uploaded a *CoCo Max III* picture of Loni Anderson converted from a Macintosh picture, and several other *CoCo Max III* pictures that he converted from DS-69 digitized images. **Ken Schunk** (KENSCHUNK) uploaded a *QuickBASIC* program for IBM compatibles that lets them display digitized DS-69 pictures from the CoCo SIG. **Orman Beckles** (ORMAN) uploaded his *FireStorm* program for simultaneously generating interesting graphic displays and relaxing music. **Roger Bouchard** (HARBIE) uploaded a very popular utility for converting 256-by-256 digitized images into HSCREEN2 pictures. Roger also uploaded an MGE demo program he wrote for his local Radio Shack store. The program will continuously display all of the MGE pictures on a disk to demonstrate the graphics abilities of the CoCo 3.

In the Source topic of the database, **Mike Ward** (MIKEWARD) provided the source code for his MUSORC program, which he posted in the Music topic of the database. The full program allows one to play *Musica* files in stereo through the *Orchestra-90* pack.

In the Utilities & Applications topic of the database, Brian Stretch provided parallel port printer drivers for use with the JFD-CP disk controller. Brian provided a version for CoCos 1 and 2 and a separate version for the CoCo 3. **Bob Montowski** (GRAPHICSPUB) uploaded an Ipatch file to allow the use of a Gemini printer with *Home Publisher*. **Rodger Alexander** (SALZARD) uploaded an ARCed file called STAREDIT, which contains a utility for editing downloadable character sets for the line of Star printers. Orman Beckles provided his *Palette Master* program, while **Hadley Hazen** (HAZE) uploaded Version 2 of his disk label-maker program.

In the Hardware Hacking topic of the database, **Marty Goodman** (MARTYGOODMAN) uploaded a valuable text file chockfull of analog RGB video information.

In the Games topic of the database, **John Barrett** (JBARRETT) uploaded four games: *Moon Miner, Seeker, StarWays* and *Interstellar Kamikaze*. **Nathan Camp** (NATHANCAMP) uploaded his help program for dungeon masters, and **David Yale** (DAVEYALE) uploaded the "DM Friend" program that he wrote three years ago. **Blair Hogg** (BLAIRH) provided information on moving *Flight Simulator* to other types of disks. **Paul Dion** (PAULNORMAND) provided two games written in BASIC called *Gorfland* and *Dfishing*.

In the Classic Graphics topic of the database, **David Mills** (DAVIDMILLS) uploaded a great demonstration program of his space shuttle and database package. Orman Beckles uploaded some famous faces from science fiction pictures, and several pictures of Barry Silverman in various formats.

In the Music & Sound topic of the database, **Mike Ward** (MIKEWARD) uploaded his popular MUSORC utility program in response to several questions in the CoCo SIG Forum. This utility will allow you to play your *Musica* files through the *Orchestra-90* pack in stereo. It uses the all-RAM, high-speed mode to improve the music quality. You may interrupt any tune in mid-play by pressing BREAK. It also provides for playing all of the tunes on the current disk. Orman Beckles uploaded several music files, including lost music from *Star Trek, Color Midi II* music, the "Post Frowien Blues," and several *Colorchestra* files. Orman also posted *The Creator*, a utility to change your *Musica II* files into stand-alone binary files.

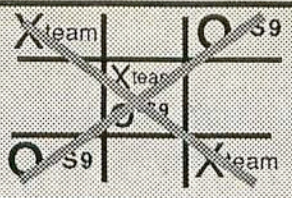
In the Archives topic of the database, Dick White posted eight more archived polls.

In the Product Reviews & Announcements topic of the database, Christopher Burke provided a product announcement about Version 2.0 of *Hyper I/O*. Steve Ricketts provided a text file of his experiences with *Word Power 3*, and **Jim Goettig** (JGMG) uploaded a revision to his original review of *Word Power 3*. **Jim Reed** (JIMREED) posted a text file that gives a quick peek at the features of the new *Telewriter-128* from Cognitec.

In the Data Communications topic of the database, Mike Ward provided a modification for Version 4.7 of his popular terminal program *MikeyTerm* that forces it to wait for an acknowledgment from the host after an Xmodem upload has completed. If you are having trouble with aborted uploads after they appear to have completed OK, or you want to rid yourself of that "Second EOT missing" message on Delphi after an Xmodem upload, you might want to try this modification.

As you can see, we had a very active and interesting month on the Rainbow SIGs! Hope to see all of you online on Delphi!

XTEAM & OS-9



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Formatting Text With *Telewriter*

By Jose L. Jimenez

Our family was divided between *Color Scripsit* and *Telewriter-64*. My son used to think *Scripsit* was the greatest until he saw the quality of work possible with *Telewriter-64*. I changed his loyalty by providing him with a very simple means of accessing some of the more complex features of *Telewriter-64*, such as using different type fonts on the same page and making lines, charts and even extra-large characters and graphics.

In this article I will show you how you can easily use *Telewriter-64* to format your text.

Different Type Fonts

Most modern printers have a variety of fonts that can be accessed by sending the appropriate control codes to the printer. With *Telewriter-64* you can make dynamic changes of fonts within the text — not all word processors can do this. The following examples access the fonts most common on the Tandy series of printers, except for the DMP-100:

```
CONDENSED
NORMAL
CONDENSED+ELONGATED
NORMAL+ELONGATED
```

Using *TW64*, type the following listing and save it as PRINTDRI/TWR:0 on the same disk as your *TW64* backup:

```
^T 05 15 20 25 30 35 40 45
 50 60 [TABS]
^D1 014
^D2 015
^D3 18
^D4 27 14
^D5 27 15
^D6 27 19
^D7 27 20
^D8 30
^D9 94
^T ==================
^S1 M0 C72 U2 L66 B5
^T ==================
```

(This provides printer control code definitions.) You can also add the printer control codes shown in Figure 1. If you need more memory, the chart can be deleted by using CLEAR-E at the end of the chart and CLEAR-X at the beginning of the chart.

Notice (in Figure 2 and the listing) we have used an up arrow (^) character before the instruction. To generate the up arrow, use CLEAR-.. The ^ is an *instruction* sent to the printer. After the ^ we must define whether the instruction is functional, change of character size, condensed, normal, etc., or if it is a special character that is not found on the keyboard. If we follow the ^ with

Figure 1: Printer Control Codes

Function	Control Code
Bold start	27 31
Bold end (new)	27 32
Bold end (old)	27 30
Elongated/pitch start (new)	27 14
Elongated end (new)	27 15
Elongated (old)	31
Elongated (new)	32
Type, proportional, select	27 17
Type, 10 pitch, correspondence, select	27 18
Type, 10 pitch, standard, select	27 19
Type, 12 pitch, correspondence, select	27 29
Type, 12 pitch, standard, select	27 23
Type, condensed, select (new)	27 20
Type, condensed, select (old)	27 14
Type, condensed, cancel (old)	27 15
Type, italics	27 66
Type, microfont	27 77

Jose L. Jimenez owns his own business and lives in San Jose, Costa Rica. He and his family enjoy programming on the CoCo and put it to use in the business.

DP, it is a *printable instruction.* If we follow the ^ with D, this is a *control instruction to the printer* such as condensed, normal, etc.

Accessing Printer Character Fonts

In order to access any font your printer has, place the file PRINTDRI/TWR at the beginning of your new file. All you need to do is press CLEAR-#. The # is any number from 1 through 9. Zero is reserved for a 51-column display mode and cannot be used for printer control codes. For instance, if you want a word to be condensed, press CLEAR-7 (press CLEAR and 7 simultaneously). Notice that a small number 7 appears on the screen. Do not forget to place CLEAR-6 at the end of the word, phrase or paragraph to come back to normal characters. Access to other fonts is described in Figure 2.

If your printer has more font sets than are covered here (such as bold, italics, microfont, etc.), you can redefine any of the nine controls on the table of Control Code Definitions at the beginning of PRINTDRI/TWR and establish your own. By using the proper CLEAR-# you will obtain the results you need for other print controls. See Figure 1.

If you run out of control codes 0 through 9 (it happens to me quite often), you can redefine controls at any time within the text. The printer goes by the last definition you made.

It is a good habit to end all files on normal operation of your printer to avoid having to turn it off to reset normal operation — quite an inconvenience for the next user.

Additional Printer Control Codes

The printer controls in Figure 1 were taken from *How to Use Your Radio Shack Printer*, Page 56, by William Barden, Jr., published by Tandy. Check your printer manual to establish which one you can use.

Setting Up a Permanent Printer Format

By typing in and saving PRINTDRI/TWR on the same disk with your *Telewriter-64* backup, you are able to make a simple format of your next file. Simply read in PRINTDRI/TWR:0 and proceed to type your new file. For existing files, you can read in PRINTDRI/TWR and append your existing file.

Characters Per Line

Each font requires different spaces to be printed, and it is difficult to guess or count the number of characters that fit in one line. The graphic rulers in Figure

Figure 2: Reference Chart of Printer Format Codes

Format Instruction		Printer Control Code	
^S	Single line	^1	Ends underline
^M	Left margin	^2	Begins underline
^C	Characters per line	^3	Select graphics mode
^U	Upper margin	^4	Begins elongated
^L	Lines per page	^5	Ends elongated
^B	Bottom margin	^6	Select normal characters
		^7	Condensed characters
^T	1st line tabulator	^8	Ends graphics mode
	Doesn't print line	^9	Up arrow

SPECIAL CHARACTERS:

^	CLEAR period	[	SHIFT up arrow
\	CLEAR comma	]	SHIFT CLEAR

Printer Control	CLEAR+number or letter
^47 Long condensed 56	^N Skip page
^46 Normal long --56	^Q FILE/EXT:0 next file
^7 Condensed ----6	^;] Do not justify

Figure 3

S	=Line spacing	1	=Single Space 2= Double Space	[1]
M	=Left margin	0	=Zero spaces on the left side	[2]
C	=Characters per line	80	=80 characters limited by printer	[3]
U	=Upper margin	0	=Zero lines empty on top of page	[4]
L	=Lines per page	66	=66 full line feeds per page	[5]
B	=Bottom margin	0	=Zero lines empty on the bottom	[6]

[1] values of 0 to 255 maximum.

[2] 0 to 255 maximum. Left margin plus characters per line cannot exceed the capacity of the printer (usually 80- or 132-column) on the size of character you are using. You can print in multiple columns by changing the left margin and making multiple passes. A good combination of format control for two columns with condensed (132-column) characters is ^M5 C57 M5 for the first column and ^M70 C57 for the second. Place the second instruction on the page break and use the One Page control on the Format menu.

[3] 0 to 127 maximum. Right margin is determined by the capacity of the printer minus the left margin minus the characters per line.

[4] Default is 4.

[5] Normally, a printer defaults to full line feed, but you can also alter this condition either under program control or sending control to the printer. Early Radio Shack printers could only move the paper forward (such as the DMP-120). Newer printers can move backward to print accents and do graphics work. Half-forward and half-backward are used in conjunction with superscript and subscript. See the chart below for different types of line feed.

[6] Default is 4, but must be at least 3 to print page numbers on the bottom.

Type of Line Feed	Line Feeds Per Page	Movement	Control Code
Full Forward Line feeds	66	0.166 inches	27 54
3/4 Forward Line feeds	88	0.125 inches	27 56
1/2 Forward Line feeds	132	0.833 inches	27 28
1/12 Forward Line feeds	550	0.020 inches	27 50
Full Backwards Line	66	0.166 inches	27 10
1/12 Backwards Line	550	0.020 inches	27 30

Figure 4: Graphic Rulers

```
[CLEAR7] FOLLOWING SAMPLE IS GOING TO BE PRINTED WITH CONDENSED CHARACTERS MAX 131 CHARACTERS PER LINE [CLEAR6]

         1         2         3         4         5         6         7         8         9         10        11        12        13
^T-0000000000
```

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Using LEDs to see which slot on your Multi-Pak is active

Multi-Pak LED Update

By Tony DiStefano
Rainbow Contributing Editor

Back in February '85, I wrote an article describing how the Tandy Multi-Pak worked. I followed that up with a project involving a little circuit that could decode the latched bits and drive some LED digits to tell you which slot was active. Since there were two active areas of memory available in the Multi-Pak, you needed two LED digits and two driver chips. It worked well for a time but, as always, Tandy likes to throw some curves — they changed the insides of the Multi-Pak.

In order to make the Multi-Pak less expensive to make, and therefore less expensive to buy, they took many of the chips, grouped them together and made one big custom clip. This was great for them, as the price for the Multi-Pak went down and they sold more of them. Good for them, but not so good for my circuit — it no longer worked. Those latched bits I used to get the data to drive the LEDs are no longer there.

When this new Multi-Pak came out in '86, I got a few letters asking if there was anything I could do. At the time I thought it would be too much trouble to redesign the circuit, too many chips and too much work for it to be worthwhile to build. But lately I've had some calls about this one again. So here goes another big project.

Reviewing the Multi-Pak

Let's recap what was said in that article. The first half of the article described the functions of the Multi-Pak and the second half described how to hook up LEDs to tell you which slot is active. The two active areas in the Multi-Pak are the CTS and the SCS areas. The CTS is mapped from $C000 to $FEFF for CoCos 1 and 2 and from $C000 to $FDFF for the CoCo 3. The SCS is mapped from $FF40 to $FF5F on all three CoCos. These mapped areas can be switched to any of the four slots of the Multi-Pak, together *or* independently. That means you can have the CTS in Slot 4 and the SCS in Slot 2 if you want.

These memory areas can be switched both in hardware (via the switch on the front of the Multi-Pak) or in software (via one memory location). The switch is simple to operate; before turning the computer and Multi-Pak on, slide the switch to the desired slot number. When you turn the computer on, the active area (or slot) is identical to the slot number on the switch in front. The hardware switch cannot change the SCS and CTS separately, only both of them at the same time. Sliding the switch to another slot number with the power on will change slot access, and probably crash your software program at the same time. There is, however, a time when the switch no longer works to switch these areas.

Let's go back to the software switch. It, too, can change the active slot area; it does so by writing a number to a read/write byte in the memory map, the byte at $FF7F. This byte is divided into two nibbles (a nibble is four bits); the lower nibble controls the SCS area and the upper nibble controls the CTS. A value of 0 to 3 in any of these nibbles selects slots 1 to 4, respectively. One interesting thing this memory byte does, once you've written to it, is lock out the hardware switch. Sliding the switch on the front panel does not work after you have changed the slot access from software.

Now, both the newer and older Multi-Paks do the same thing. But because we don't have access to the latched bits on the newer board, the project I did back in 1985 will not work on the new Multi-Pak. The circuit I have come up with now works just like the older Multi-Pak's circuit, allowing you to hook up the LEDs as before.

The Project

This circuit requires just five chips. These chips can be mounted on a small PCB that you can get from any Radio Shack. It does not require an edge connector, because it does not connect to the slots of the Multi-Pak. Instead, you have to open up the thing and insert this circuit inside. This is not too bad, because you have to open it up anyway to get the LEDs in there.

Figure 1 shows the circuit in question. A step-by-step description will help you understand it. Let's start with U1 and U2: These chips are used to decode the memory map into one byte, Byte $FF7F, which is 16 bits long. Out of these 16 bits, 15 of them are 1s and only one of them is 0. The 74LS133 (U1) takes care of 13 of them. When all of these are high, the output goes low. This output goes to U1, a 74LS138, where the E clock, read/write line and the rest of the address lines are decoded. Only one output is used to write to the 74LS173, which is a four-bit latch used to record what slot is active.

The 74LS368 is a six-bit buffer (we will use only four bits, however) whose input comes from the switches on the front of the Multi-Pak. You can get these signals from the 64-pin chip inside the Multi-Pak. The A pin in Figure 1 connects to Pin 21 of IC 6, and B connects to Pin 22 of the same chip. These two signals are split to form the four bits necessary for the LEDs. This is where the four connections of the LEDs project connect to. Here is the connection list for these pins:

Pin No.	U13 of LEDs Project
C	2
D	3
E	14
F	13

This chip (U5) will output the status of the front switch when the Multi-Pak is first turned on, due to the U4, a 74LS74. This is a D-type flip-flop. On power-up or reset, the Q (Pin 5) output of this chip is low, which activates U5. At the same time, *Q (Pin 6) is high,

Tony DiStefano is a well-known early specialist in computer hardware projects. He lives in Laval Ouest, Quebec.

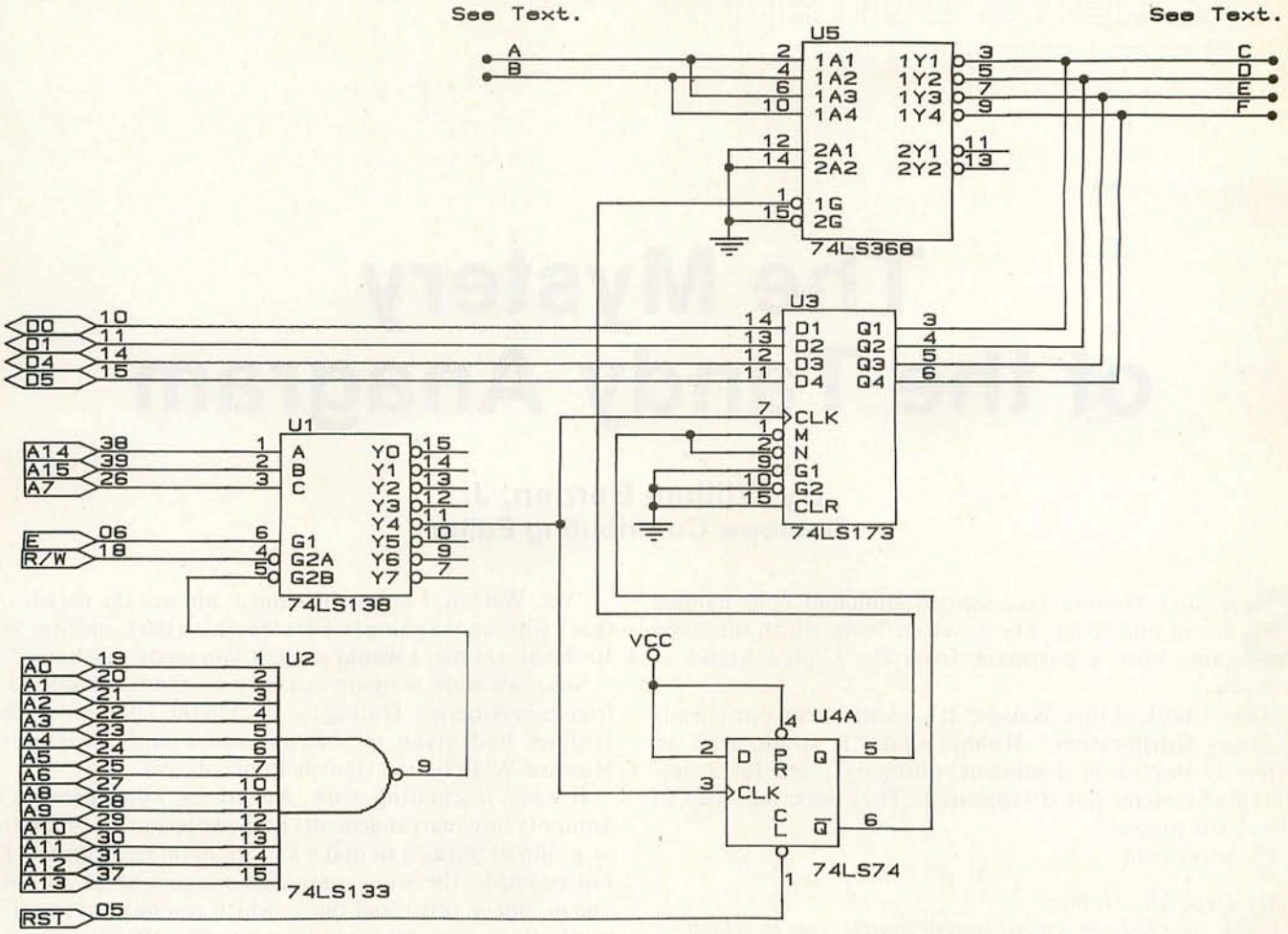

Figure 1

which keeps U3 in activated (tri-state). U3 has to be kept in this state because no data has been assigned to it; that would give random values to the LEDs. On the other hand, U5 is activated to give the status of the switch, which conforms to the old Multi-Pak.

The output of U1 also goes to the clock input of U4, so when your software program writes to $FF7F, to change the active slot for the first time, it flips the outputs Q and *Q. This, in turn, deactivates U5 (connected to the switches) and activates U3. The new values just entered into the latch at U3 are now valid, and the flip-flop action of U4 brings this data out to the LEDs. From then on, changing the switch has no effect on the LEDs. The switch will have no effect until one of two things happens: Either a reset occurs or the power is turned off. Pressing the reset button will again flip U4 back to its original state and therefore re-enable the switches. Turning the power off also flips the condition of U4.

This project for the newer Multi-Pak is not very difficult, but you must have done (or do now first) the project from 1985 for this one to be useful. The standard project builder's kit is necessary. These parts are not available from Radio Shack, but are at most well-stocked electronics shops. Active Electronics is my best source for almost all the electronics parts I buy.

There is one more thing yet to do; The program I use to generate the circuit diagram in Figure 1 does not put in the pin numbers for 5 volts and ground. Figure 2 shows a list that explains which pin goes where in the power and ground department.

In the Multi-Pak, you can get 5 volts from Pin 9 of the connector and ground connections from pins 33 and 34.

Chip #	+5 Volts	Ground
U1	16	8
U2	16	8
U3	16	8
U4	14	7
U5	16	8

Figure 2

In my January 1988 column (Page 144), I requested that my readers send in a hardware projects "wish list." I have gotten a few responses.

Some have been good, and I will get to work on them, but some are a bit far-fetched. Try to keep your ideas limited to small projects — some guys asked to do a project that would cost several times the price of the computer, the Multi-Pak, my drives and then some!

Barden's Buffer

16K ECB

The Mystery of the Tandy Anagram

By William Barden, Jr.
Rainbow Contributing Editor

Sherlock Holmes' face seemed animated as he handed me an odd letter. The envelope from which the letter came bore a postmark from the United States of America.

"Take a look at this, Watson. It's a letter from our friends at Tandy Corporation," Holmes said. "It seems as if an extremely important document, outlining plans for a new computer system, has disappeared. They seek our help in solving the puzzle."

The letter read:

My Dear Mr. Holmes:

I seek your help in a most urgent matter, one in which we do not wish to involve the local law enforcement. A most secret document was stolen from one of our company executives. The future of the company may well depend upon it, and for that reason we do not wish the matter to be made public.

My name was signed on a note the thief left, and I am under suspicion.

Name your price, Mr. Holmes. We will be most pleased if you will help us in this matter.

Your humble servant,
Gil B. Ube
Vice President
Assembly and Dissembling

"My dear Watson, can Mrs. Watson spare you for a few days?"

"Of course, Holmes. As a matter of fact, she's at her sister's in Chesterfield."

"Then there's no time to lose, Watson. I fear the culprit may already be out of our reach!"

"But, Holmes, do you mean you have already solved the mystery?" I exclaimed.

"Yes, Watson, I know the culprit, but not the details. And that's why we are going to Fort Worth, to the Lone Star State! In the meantime, I would suggest you study this book."

Soon we were winging our way on the Concorde to our friends in America. During the brief flight, I perused the book Holmes had given me, *Palindromes and Anagrams* by Howard W. Bergeson (Dover Publications).

It was a fascinating work. Anagrams, which date back to antiquity, are rearrangements of the letters in a word, phrase, or group of phrases to make a meaningful new construction. For example, the word *anagrams* contains three *a*'s, one *g*, one *m*, one *n*, one *r* and one *s*, which can be rearranged into two Latin words: *Ars magna* ("great art"). "Police protection" becomes "Let cop cope in riot." "Real estate transaction" becomes "It's a neat sale or rent act." The more meaningful the new phrase, the better the anagram. From one phrase, it is sometimes possible to construct hundreds or even thousands of anagrams.

Charades are another form of anagrams. In charades, the letters are left in the same order, however. "Amiable together" becomes "Am I able to get her?"

Palindromes, the book went on to say, are not only anagrams, in which the same letters and number of letters are used in the new phrase, but the phrase reads the same forward and backward! The most famous palindrome is, perhaps, "A man, a plan, a canal — Panama!" Another famous palindrome is Napolean's lament, "Able was I ere I saw Elba."

A palindromic sentence is a structure in which the *words* read the same forward and backward, for example: "You can cage a swallow, can't you, but you can't swallow a cage, can you?" Long poems or narratives have been written using palindromes by letters or by words. The more meaningful the poem, the better the palindrome.

I set the book aside and turned to Holmes. "I say, Holmes, this is a capital book, but what does it have to do with the problem in Fort Worth?"

"All in good time, Watson, all in good time," said he.

The Concorde landed at the Dallas/Fort Worth air terminal, and we were whisked away by the Tandy Hyundai limousine. During the short drive from the terminal to One

---

Bill Barden has written 27 books and over 100 magazine articles on various computer topics. His 20 years' experience in the industry covers a wide background: programming, systems analysis and managing projects for computers ranging from mainframes to micros.

Tandy Center, Holmes was reflective, finger tips steepled together and elbows on knees.

We were met at One Tandy Center by Gil B. Ube, a Tandy vice president from Japan. He was a fit-looking businessman, dressed in traditional Tandy gray.

He offered us his hand in greeting.

"Ah, Mr. Holmes. I'm so happy you found the time to help us with our problem. And, I might mention, *my* problem, since the thief has used *my* name."

"Mr. Ube, it is my pleasure to be able to help. I am a longtime admirer of Tandy products, and have a Color Computer 3, a Tandy 1000 TX and a Model 102. And now, if you don't mind, perhaps we could see the scene of the crime?"

"Certainly, Mr. Holmes. Come this way, gentlemen."

We followed Mr. Ube to an elevator and presently found ourselves on the 15th floor of One Tandy Center. A great deal of construction was evident.

"Please excuse the mess — we're recarpeting mahogany row. It will be done shortly. This is the office of John Ochra, *capo de capo*."

"I see you are familiar with Italian, Mr. Ube."

"My mother's side of the family, Mr. Holmes."

"Ah, yes. Northern Sicily, I believe, about 40 kilometers from Palermo. The daughter of a wine merchant, I would say."

The executive expressed great surprise. "Why, Mr. Holmes! How could you have known that?"

"Tut, tut, Mr. Ube. I wrote a short monograph on Italio-Japanese accents some time ago. Pray continue."

"Mr. Ochra was sitting at his desk that night, reviewing our new Color Computer product — which, I'm sorry, I can't say much about, Mr. Holmes."

"Other than the fact that it runs at 20 MHz, uses a 68020, is multitasking, has 1,024-by-1,024 screen resolution with a palette of 1,024 colors, has a built-in, 80-megabyte disk drive, and sells for under $200 with monitor, neither can I, Mr. Ube," remarked Holmes. "I quite understand. Propriety is the lifeblood of computer companies these days."

The executive turned several colors never seen on a Color Computer and hesitantly continued.

"The product is defined in a 100-page specification marked TOP SECRET. Only two copies exist, and Mr. Ochra was reading one of them."

"Where is the other?"

"Locked quite securely in Mr. Ochra's safe. He verified that shortly after the theft.

"It was quite late, and Mr. Ochra was the only person on the floor. Leaving the document on the desk, he went downstairs to get some refreshment. However, hardly had he left the elevator on the first floor when he noticed by the control panel that a second elevator was stopping on the 15th floor. He immediately boarded the elevator and pressed the 15th floor button. When he arrived on the floor and reached his desk, he found, to his horror, that the document was gone. In its place was this note."

Holmes looked briefly at the note. It read:

Tandy, are you happy, really happy, you are Tandy?

Gil B. Ube

"As you can see by the note, Mr. Holmes, it was signed by me! And in my handwriting."

"I would not have expected less."

"Does it mean anything to you, Mr. Holmes?"

"Yes, I believe it does. May I keep this?"

"Please do."

"Tell me, Mr. Ube, had Mr. Ochra observed anyone else on his floor before that time?"

"Only a cleaning woman and a security guard. The cleaning woman arrived at 6 o'clock p.m. and left at 6:30. The security guard passed through briefly at 7:05 p.m., shortly before the theft."

"Mr. Ube, I believe I can find the answer. Might I impose upon you to borrow some computer equipment? I neglected to bring along my Model 102."

"Certainly, Mr. Holmes. Would a Color Computer 3 disk system be sufficient?"

"That will do splendidly, Mr. Ube. Might I also borrow a list of your employees? One with their names and job classifications will do nicely."

"We'll have the list for you in a moment, Mr. Holmes."

I did not see Holmes for the rest of the day. However, later in the evening, my telephone rang.

"Watson, come here, I need you," said Holmes' voice.

You may have the wrong Watson, I thought to myself, but answered, "On my way, Holmes!"

I hurried over to Holmes' room and knocked. When he opened the door I was amazed to find the room in great disarray. The bed was overturned, the Color Computer 3 equipment was in a jumbled mess on the floor, the room lamp was smashed, and papers were strewn about everywhere.

"Holmes, what happened?" I shouted, aghast.

"He's been here, Watson — my old nemesis. I left the room

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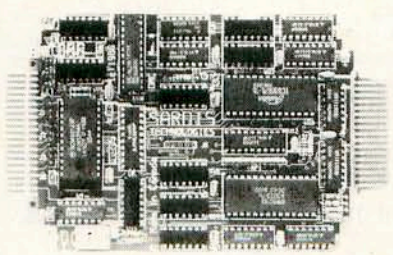

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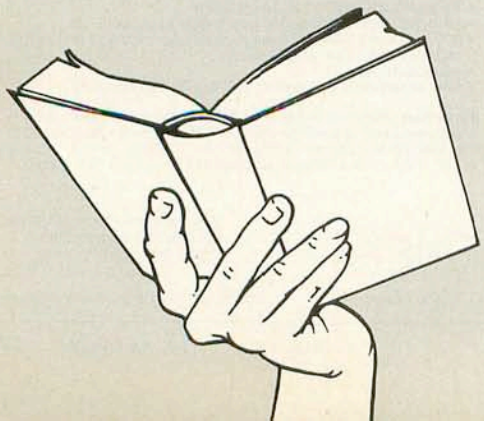

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for a brief moment to buy a copy of the *London Times* in the lobby. When I got back, I was greeted by this."

"Holmes, who has been here?"

"Moriarty, Watson. I have proven beyond a reasonable doubt that Moriarty has been undermining computer companies. Tandy is his latest effort. Help me get this room and computer equipment in order. In the meantime, please telephone Mr. Ube and have the Fort Worth police detain a Mr. James Y. Marriot."

I did as Holmes bid. However, I was informed by Mr. Ube that Mr. Marriot was nowhere to be found. He had disappeared shortly after lunch.

"Watson, I'm afraid that once again I have been too late to stop Moriarty. But possibly I can repair some of the damage he has done to Tandy. Please call Mr. Ube and have him assemble Tandy's executives."

I placed the call as Holmes requested. All conversation ceased as Holmes strode into the room, a Color Computer system under his arm.

"Gentlemen, how kind of you to come. Please forgive my delay in setting up this system."

Holmes set up the Color Computer and disk drive, and inserted a disk from his pocket. He stepped back and addressed the crowd.

"As some of you know, I have been a longtime admirer of Tandy computer products. I was therefore interested when I received this letter from your Mr. Ube.

"Something about the nature of the crime reminded me of recent events in American computer companies. I was immediately convinced that your Mr. Ube was not the criminal. Following that logic, I used a list of names of your current employees for processing by one of your wonderful machines. Let me show you what I mean."

Holmes turned to the Color Computer and loaded a BASIC program.

"This program will take any characters entered and shuffle them around to make new words or phrases. This type of rearrangement is called an anagram. Only the letters used in the original words or phrases are used. Let's take the name James Y. Marriot, from the man whom I understand is not at this meeting because he has disappeared. When the letters j-a-m-e-s-y-m-a-r-r-i-o-t are entered into this program, the computer will rearrange the letters in all possible permutations.

"One question that may spring to mind is in regard to the number of permutations. Suppose we had two letters — call them *a* and *b*. There are only two arrangements of these letters — *ab* and *ba*. Now suppose we had three letters *a*, *b* and *c*. We could have *abc*, *acb*, *bac*, *bca*, *cab* and *cba*, a total of six in all. If we used the letters in Mr. Marriot's name, we would have 13 letters with which to work. There are 13 choices for the first letter, 12 choices for the second letter — as one letter has been used from the pool of 13 letters — 11 choices for the third letter, and so on, down to one choice for the last letter. In fact, there are

13 x 12 x 11 x 10 x 9 x 8 x 7 x 6 x 5 x 4 x 3 x 2 x 1

choices, or over 6,227,020,800 rearrangements! There's a name for this formula; it's called *factorial.* You'll find the factorial symbol (!) used a great deal in higher mathematics, as I'm sure some of you are aware, with the possible exception

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of the marketing people. However, in Mr. Marriot's name, the *a* and *r* repeat, so the actual number is somewhat less.

"The programme here lists all of these combinations, but I soon realized that it would take over 197 years at one combination per second. I then modified the programme to simply help in decoding anagrams. The user first enters the entire list of letters, and then enters a word or words. The programme makes certain that the words are in the common pool of letters and then lists all remaining letters in different combinations.

"Now watch what happens when I put in the letters j-a-m-e-s-y-m-a-r-r-i-o-t and then the word *james*. The remaining letters y-m-a-r-r-i-o-t are used to form 8! words, 40,320 arrangements in all. The 21,233nd arrangement is M-O-R-I-A-R-T-Y, a man well-known by me, a master computer criminal and hacker, and skilled in the binomial theorum. I will not run through all of them, gentlemen, but you undoubtedly get the idea.

"Mr. Marriot is employed as a security guard, and is one of the people who had access to the 15th floor without creating any suspicions whatsoever. I understand, however, that Mr. Marriot has now disappeared."

"Do you mean to say that Marriot is the thief, Mr. Holmes?" asked Mr. Ube.

"Not only is he the thief, but he has systematically undermined several computer companies in the course of his career in the last 10 years. It was he who was responsible for the demise of the Timex Computer Division by its late introduction of the Timex 2068. It was he who introduced delays in the Osbourne MS-DOS machine. It was he who was instrumental in the firing of Steven Jobs at Apple. He went under a variety of names in these companies, but he could not resist flaunting his anagrammatic talent — they were all anagrams of James Moriarty — James Y. Tramori, Jamie Trysmora, James Y. Armorit, and others.

"At Tandy he was working his evil ways in the safe guise of a security guard. As a guard, he had access to all areas. And with his extensive knowledge of computers, he could easily alter company memoranda, change design specifications, or perform other acts designed to sabotage even a well-run company such as Tandy. We can only hope that he was not able to work too much damage.

"My suspicions about Mr. Marriot were confirmed when I saw the note he had left in place of the manuscript. Recall that it was signed by Mr. Ube:

Tandy, are you happy, really happy, you are Tandy?

Gil B. Ube

"This is a *sentence* palindrome — a sentence that reads the same forward or backward. It was Moriarty's final signature."

"But, Mr. Holmes, where is Moriarty now?" asked Mr. Ube.

"I expect he'll show up at Dell Computer, or Apple, or Atari, and undoubtedly in a disguise created by the surgeon's knife."

"But why does he attempt to destroy computer companies?"

"His employer dictates it."

"His employer?"

"Come, come, Mr. Ube. His employer was the reason he was able to use your name on the document. If you transpose your signature in an anagram, you'll see what I mean."

Mr. Ube thought for a moment and wrote on a convenient pad. "Oh, *that* company!" he exclaimed.

"Mr. Holmes, we don't know how to thank you. It's just unfortunate that Moriarty saw the specifications for our new computer."

"But he didn't, Mr. Ube."

"What do you mean, Mr. Holmes?"

"Moriarty made a thorough search of my room at the hotel. There was no reason for him to search my room unless he thought I had a copy of the plans. Fortunately, Mr. Ochra interrupted Moriarty's theft just in time. Remember that the document was in a bright red cover with TOP SECRET marked in bold letters. Even his fellow security guard in the downstairs lobby would notice the bulky document. Instead, he decided to hide the document and come back to retrieve it at a later time. He actually discarded it in his mad dash away from Mr. Ochra's office."

"But why wasn't he able to retrieve it, Mr. Holmes?"

"By a fortunate coincidence, the floor was undergoing remodeling, and the document was taken away the next day, together with the other documents with which it was stored. They were returned only today, and by then, he was discovered. Unless I miss my guess, gentlemen, you'll find it in that bookcase over there."

Several of the executives hurried over to the bookcase, which was crowded with multi-colored documents.

"Here it is!" exclaimed one.

"And so, Mr. Ube, I trust you will be more careful about security men in the future?" Holmes exclaimed as he took the proffered check and airline tickets. "Come, Watson, we have just time for a meal at Joe T. Garcia's before the Concorde departs."

* * *

Palindrome Program

The palindrome program in Listing 1 allows you to enter a string of characters, words or sentences and test whether what you've entered is a character palindrome — a word, phrase or sentence that has the same characters backward and forward. Spaces and punctuation are automatically discarded. For example, the exchange in entering the palindromic sentence "Draw, O Caesar, erase a coward!" would look like this:

```
WORDS: DRAW, O CAESAR, ERASE A COWARD!
PALINDROME-BOTH STRINGS ARE
DRAWOCAESARERASEACOWARD
WORDS: _
```

If the characters do not form a palindrome, both the original and reverse are printed for comparison:

```
WORDS: RATS LIVE ON NO EVEL STAR
NO PALINDROME
ORIGINAL:RATSLIVEONNOEVELSTAR
REVERSE: RATSLEVEONNOEVILSTAR
WORDS:
```

The program will run on any CoCo with Extended BASIC. Characters should be entered in uppercase.

Letter Count Program

The letter count program in Listing 2 breaks down characters, words, phrases or sentences into the number of letters, arranged in sequence. This can be helpful in making up words for palindromes or anagrams. It's always interesting

to note the large number of vowels in both palindromes and anagrams. Note the following:

```
WORDS: MADAM, I'M ADAM!
AAAA
DD
I
MMMM
WORDS: _
```

The program will run on any CoCo with Extended BASIC, and, again, characters should be in uppercase, but spaces and punctuation can be used.

Permutations Program

The permutations program in Listing 3 lists all permutations of from two to 10 letters. Sherlock Holmes used a BASIC09 version of this program in an earlier story ("The Mystery of the Novice Bell Ringer," November 1987, Page 174). The program there was a *recursive* program that called *itself*. Recursion is not possible in Extended BASIC (without a good deal of trouble, that is), but the program in Listing 3 will handle up to 10 letters. Permutations of two letters are *AB* and *BA* (1*2). Permutations of three letters are *ABC*, *ACB*, *BAC*, *BCA*, *CBA* and *CAB* (1*2*3). There are 24 permutations of four letters (1*2*3*4), 120 permutations of five letters (1*2*3*4*5), 720 permutations of six letters, 5,040 permutations of seven letters, 40,320 permutations of eight letters, 362,880 permutations of nine letters, and 3,628,800 permutations of 10 letters. The seven-letter case displays in about 15 minutes, but you can see that the cases involving a larger number of letters are not too usable.

A partial list of the anagrams of the letters in the word *BARDEN* are displayed as follows:

```
WORDS: BARDEN
BARDEN   BARDNE   BAREND   BAREDN . . .
```

BARDEN yields names I had never thought of, like *BRENDA* and the dubious *BARNED*, and also combinations from which palindromes could be made.

The program works by a series of nested calls to eight routines. At the bottom, the routine switches the last two letters of the current string. For example, *XXXXAB* would be switched to *XXXXBA*. Two swaps are made to restore *XXXXAB* to the original. The routine above calls this routine three times, thus rotating three letters with two rotations of two letters for each call. For example, *XXXABC* would be changed to *XXXBCA* and then two calls would be made to the lower routine for *XXXBAC* and *XXXBCA*; the letters would then become *XXXCAB*, with two calls for *XXXCBA* and *XXXCAB*; the letters would then become *XXXABC*, with two calls for *XXXACB* and *XXXABC*. With each shift to the left, one more letter must be rotated, and subsequent calls are made to the lower routines.

Like the previous programs, spaces and punctuation are discarded before the display is done. The `ON LEN(A$)` statement branches out to the proper level based upon the length of the input string.

The rotate subroutine performs a left rotation of all or a portion of the word. For example, if the subroutine is called with `J=5` and the letters are *ABCDEFGH*, the subroutine will set J equal to `LEN(A$) - 5 = 8 - 5 = 3` and produce *ABC* plus the left rotation of *DEFGH*, *EFGHF*. The result will be

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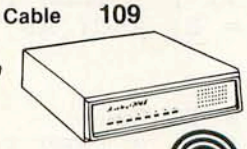

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ABCEFGHF. For a word of six letters, the subroutine is called 720 times.

FREEWALL for now. See you next month with more CoCo topics. □

Listing 1: PALINDRM

```
100 ' PROGRAM TO REVERSE STRING
TO CHECK FOR PALINDROMES
110 CLEAR 2000
120 CLS
130 LINE INPUT "WORDS: "; WD$
140 B$ = ""
150 FOR I = 1 TO LEN( WD$ )
160 A$ = MID$( WD$, I, 1 )
170 IF ( A$ > CHR$( 64 ) ) AND (
 A$ < CHR$( 91 ) ) THEN B$ = B$
+ A$
180 NEXT I
190 C$ = ""
200 FOR I = LEN( WD$ ) TO 1 STEP
 -1
210 A$ = MID$( WD$, I, 1 )
220 IF ( A$ > CHR$( 64 ) ) AND (
 A$ < CHR$( 91 ) ) THEN C$ = C$
+ A$
230 NEXT I
240 IF B$ = C$ THEN PRINT "PALIN
DROME-BOTH STRINGS ARE ": PRINT
B$
250 IF B$ <> C$ THEN PRINT "NO P
ALINDROME": PRINT "ORIGINAL:"; B
$:PRINT "REVERSE: " C$
260 GOTO 130
```

Listing 2: LETTERS

```
100 ' PROGRAM TO COUNT NUMBERS O
F LETTERS
110 CLEAR 2000
120 DIM L( 26 )
130 CLS
140 LINE INPUT "WORDS: "; WD$
150 FOR I = 0 TO 25: L( I ) = 0:
 NEXT I
160 FOR I = 1 TO LEN( WD$ )
170 A$ = MID$( WD$, I, 1 )
180 IF ( A$ > CHR$( 64 ) ) AND (
 A$ < CHR$( 91 ) ) THEN L( ASC(
A$ ) - 65 ) = L( ASC( A$ ) - 65
) + 1
190 NEXT I
200 FOR I = 0 TO 25
210 IF L( I ) <> 0 THEN FOR J =
1 TO L( I ): PRINT CHR$( I + 65
);: NEXT J: PRINT
220 NEXT I
230 GOTO 140
```

Listing 3: PERMS

```
100 ' PROGRAM TO LIST ALL PERMUT
ATIONS OF A PHRASE
110 CLEAR 2000
120 PRINT
130 LINE INPUT "WORDS: "; WD$
140 A$ = ""
150 FOR I = 1 TO LEN( WD$ )
160 B$ = MID$( WD$, I, 1 )
170 IF ( B$ > CHR$( 64 ) ) AND (
 B$ < CHR$( 91 ) ) THEN A$ = A$
+ B$
180 NEXT I
190 ON LEN( A$ ) GOTO 190,360,34
0,320,300,280,260,240,220,200
200 FOR K = 1 TO 10: GOSUB 220:
J = 10: GOSUB 380: NEXT
210 END
220 FOR L = 1 TO 9: GOSUB 240: J
 = 9: GOSUB 380: NEXT
230 IF LEN( A$ ) = 9 THEN GOTO 1
20 ELSE RETURN
240 FOR M = 1 TO 8: GOSUB 260: J
 = 8: GOSUB 380: NEXT
250 IF LEN( A$ ) = 8 THEN GOTO 1
20 ELSE RETURN
260 FOR N = 1 TO 7: GOSUB 280: J
 = 7: GOSUB 380: NEXT
270 IF LEN( A$ ) = 7 THEN GOTO 1
20 ELSE RETURN
280 FOR O = 1 TO 6: GOSUB 300: J
 = 6: GOSUB 380: NEXT
290 IF LEN( A$ ) = 6 THEN GOTO 1
20 ELSE RETURN
300 FOR P = 1 TO 5: GOSUB 320: J
 = 5: GOSUB 380: NEXT
310 IF LEN( A$ ) = 5 THEN GOTO 1
20 ELSE RETURN
320 FOR Q = 1 TO 4: GOSUB 340: J
 = 4: GOSUB 380: NEXT
330 IF LEN( A$ ) = 4 THEN GOTO 1
20 ELSE RETURN
340 FOR R = 1 TO 3: GOSUB 360: J
 = 3: GOSUB 380: NEXT
350 IF LEN( A$ ) = 3 THEN GOTO 1
20 ELSE RETURN
360 FOR S = 1 TO 2: J = 2: PRINT
 A$,: GOSUB 380: NEXT
370 IF LEN( A$ ) = 2 THEN GOTO 1
20 ELSE RETURN
380 ' SUBROUTINE TO ROTATE PORTI
ON OF WORD
390 ' ENTER WITH J=# OF LETTERS
IN GROUP
400 ' ENTER WITH A$=WORD
410 ' EXIT WITH A$=ROTATED WORD
420 J = LEN( A$ ) - J
430 B$ = RIGHT$( A$, LEN( A$ ) -
 J )
440 B$ = RIGHT$( B$, LEN( B$ ) -
 1 ) + LEFT$( B$, 1 )
450 A$ = LEFT$( A$, J ) + B$
460 RETURN
```

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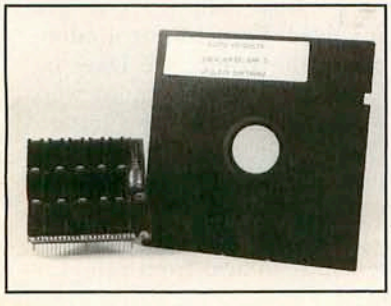

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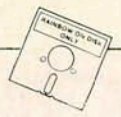

Patches, Programs and Politics

By Dale L. Puckett
Rainbow Contributing Editor

Things are looking up. One day last week I received a new issue of *MOTD* from the OS-9 Users Group. The next day the mailman brought *Home Publisher*, Tandy's new desktop publishing program for the Color Computer 3. During the weekend, I started using an alpha test copy of *Wiz2* from Bill Brady, and I had time to dive into Computerware's fantastic window-based database manager, *Data Master*.

Dave Kaleita, the OS-9 Users Group's take-charge president, is really getting the group moving. The new 12-page *MOTD* looks great, thanks to Editor Bill Brady's skills with the *Ready Set Go* desktop publishing program. It's printed on 8-by-10 paper and can easily be saved in a three-ring binder. A ballot printed on Page 11 of *MOTD* gives you a chance to vote for a new slate of officers.

Brady writes that he is "downright excited." He expects many new OS-9 users in the near future and predicts that OS-9 is quickly coming out from "underground." He cites the fact that Personal OS-9 is now available for the Atari ST, which runs a 68000 processor. He also notes that OS-9 Level II on the Color Computer is just about the most effective, mature operating system available in the personal computer world.

Brady passed kudos to Microware for picking up the pieces of the Atari ST port after TLM Systems dropped it. The ST port marks the first time Microware, having dealt only with large companies like Tandy, has sold operating systems directly to the public. In fact, Microware now runs its own SIG on CompuServe to help its customers. Just type `GO MSC` for help.

Here's a tip you may find handy if you, like Brady, own several different computers — or use a different computer at the office — and want to transfer graphics images between them. When you type `GO PICS` on CompuServe, you enter a SIG designed to let you exchange pictures with anyone using any computer. Utilities are posted there that let you translate a graphics file created on your Color Computer into a `.GIF` file.

The idea is to convert your image into a `.GIF` file and upload it to the Pics SIG where other computer users can download it and display it on their screens. For example, if a Macintosh user saw a CoCo image and wanted to print it in a newsletter, he would run a utility designed to translate the `.GIF` file into a *MacPaint* file and then upload it.

This is precisely how Brady was able to print several screen images of *MultiVue* in his first *MOTD*. Kevin Darling saved the images in the familiar `.VEF` format and then ran one of the utilities to convert them to `.GIF` files. He sent them to Brady in the `.GIF` format, and Bill used the `.GIF`-to-*MacPaint* utility to convert them to a file he could pour into *Ready Set Go*. Magic.

While we're on the subject of *MOTD*, Kaleita says he hopes the present issue generates enough membership renewals that he will be able to have Brady publish one every other month. The OS-9 Users Group's address is Suite R-237, 1715 East Fowler Ave., Tampa, FL 33612. Inexpensive access to the group's outstanding public domain software library is worth the price of admission — $25 for one year's dues. *MOTD* is a bonus, a valuable and nice-looking one at that.

Since Kaleita has assumed command, things have really started to happen with the Users Group. In fact, this past weekend I had the pleasure of joining the Users Group's elected officers in a conference on RAINBOW's Delphi OS-9 Online SIG. Like any good leader, Kaleita has delegated many of the tasks of the organization to his board of directors. And he's given his troops enough responsibility to get the job done.

Perhaps you would like to get involved. Kaleita's officers hope so. In fact, during the conference they spent more than several minutes trying to figure out a way to make it possible for the group's many volunteers to get directly involved. For additional information about the group, see Dave or George Dorner — and who knows who else will show up — at the Chicago RAINBOWfest. Or, drop a quick note to any of the officers on the Delphi OS-9 Online SIG; their usernames are OS9UGP, OS9UGVP, OS9UGS and OS9UGE. They'll be happy to hear from you.

Dale L. Puckett, who is author of The Official BASIC09 Tour Guide *and co-author, with Peter Dibble, of* The Complete Rainbow Guide to OS-9, *is a free-lance writer and programmer. He serves as director-at-large of the OS-9 Users Group and is a member of the Computer Press Association. Dale is a U.S. Coast Guard lieutenant and lives in Rockville, Maryland.*

Wiz2 on the Horizon

Wiz2, from Bill Brady, promises to be one of the best communications programs on any microcomputer. I have tried both *Red Ryder* on the Macintosh and *ProComm* on the IBM PC. Both are outstanding products and lead the pack on their machines, but *Wiz2* offers more functionality and ease of use than both of these programs.

Wiz2 is an advanced communications program for users with special needs, yet it's the easiest terminal program to install and run on an OS-9 based Color Computer 3. Not bad for a product that was born for only one reason — to demonstrate to software developers and OS-9 users alike the gargantuan programming power lying dormant in BASIC09.

Wiz2's esthetic appeal is made possible by the windowing system built into OS-9 Level II, easily accessible from BASIC09. The interactive nature of BASIC09 lets Brady deliver his masterpiece quickly. Its modularity lets him build the program from a number of small modules that are relatively easy to write and maintain.

Here's the good news! When *Wiz2* is released sometime this summer, the original *Wiz* will not be taken off the market. If you buy *Wiz* before *Wiz2* is released, you will be able to upgrade to *Wiz2* at a small cost by using the coupon found inside the original *Wiz* manual. This means you don't have to wait for *Wiz2* to experience the *Wiz* communications environment. Once you've used the friendly, menu-driven, window-based *Wiz*, you'll never want to go back to a command line-oriented communications program.

The alpha test version of *Wiz2* that we are running now has a two-line billboard and status window along the top of the screen. A single line at the bottom of the screen gives you status information during a file transfer and takes your input if you go into conference mode — or go online temporarily while "editing" your data buffer.

"Buffer editor" is probably not the right name for a new feature that puts *Wiz2* miles ahead of the competition. Yet neither Brady nor Kevin Darling could think of a good name to describe it. In fact, I couldn't think of a name either, but let's take a look.

When you hold down the ALT key and strike the up arrow key, *Wiz2* opens a new 12-line overlay window and displays some of the text you have been receiving. You can use the up and down arrow keys to scroll through the last 8,000+ characters received in your buffer. If you find something you want to save or print, you can mark it and send it to the printer or take a snapshot and send it to your disk.

Here's a list of *Wiz2* "buffer editor" commands:

- q quit
- t mark top
- b mark bottom
- f find
- g goto
- e eject page
- z reset — or unmark text
- s snap marked text to disk
- p send marked text to printer
- o go online

A typical scenario might read like this. You see a message scroll by that you want to save for future study. After you finish the task you were already busy with when the message displayed on the screen, you press ALT and the up arrow to work in your edit buffer. You quickly find the message by pressing F. Seconds after you press ENTER, *Wiz2* displays the line that contains your subject.

You then strike the up arrow key to move to the top of the message. When the cursor arrives on the first line, press T to mark the top. Then use the down arrow key to move to the last line of the message. As you move through the buffer, the text that you pass is highlighted. When you arrive at the last line of the message, and it is highlighted, press B for bottom. Then press P and a copy of the message is sent to the printer. A Q closes the overlay window and puts you back online normally.

If you need to go online and make a quick comment while working within the buffer, you can press O for online. When you do this, *Wiz2* displays online copy in the two-line status window at the top of the screen and accepts input from you on the single-line window at the bottom of the screen.

I hooked up my CoCo 3 with *Wiz2* to an amateur radio receiver connected to a packet radio terminal monitoring a DX tracking network and set out to test *Wiz2*. It worked like a charm, but I quickly dreamed up a "wish list" and gave Brady a call. We kicked around some ideas, and he's working on them now. That's one of the reasons he hasn't committed himself to a delivery date for *Wiz2*.

When *Wiz2* does hit the street, you will be able to set up your own environment. This means you will have total

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control over *Wiz2* windows, and will be able to select the screen's type, color and size — within reason and the limits of a 24-line screen.

For example, if you rarely use *Wiz*'s interactive graphics mode, you will want to configure your copy of *Wiz2* to run in text-only screens. Windows will open up to three times faster, and text will scroll by on the screen much more quickly. Additionally, you'll be able to use more colors in a screen than you can when you run in a slower graphics screen.

Data Master Does Windows

We finally got a chance to fire up *Data Master*, the new OS-9 database manager from Paul and Sue Searby at Computerware, 4403 Manchester Ave., Suite 102, Box 668, Encinitas, CA 92024. This program can read old files you created under *Databank Manager* or *OS-9 Profile*. It can also read files created by *DynaCalc* — or write out its own information in a form that can be read by *DynaCalc*.

To run *Data Master*, you create an 80-by-24, Type 2 window and start an OS-9 shell in it. At that point, you need only type DM to run this program — assuming, of course, that you have stored a copy of the file DM in your current execution directory. Once *Data Master* is running you really don't need a manual. Basically, the only thing you need to know is that you can see the items in the first menu by pressing the slash key (/). When you've done this, a menu window pops down under the Desk menu.

Like all professional OS-9 programs, *Data Master* gives you direct access to the OS-9 shell from within the program. And like any good database program, it validates your data for you while you are typing it. Other important *Data Master* features include its ability to restructure a data file and the ability to compress your files by permanently removing all deleted records (useful when you need to save disk space).

More on Packet Radio

During the past month, we spoke with John Lind, KD7XG, Orange Section Technical Coordinator of the American Radio Relay League, and received both bad and good news. The bad news is that John has discontinued his project to port the WA7MBL packet bulletin board program to OS-9. As he owns a CoCo 2, which limits him to 64K of memory, he decided after a few starts that it just wouldn't fit. He didn't believe he could get the capability out of the program with such limited memory.

The good news is that he has written an impressive high frequency propagation program in OS-9 PASCAL. He reports that it screams when compared to a C program he had written earlier. He promises to send in several procedures that demonstrate how to exercise the OS-9 windowing and graphics environment from within PASCAL. We'll share them with you when they arrive.

Lind is also writing a satellite orbit prediction program in OS-9 PASCAL. Run from his CoCo, the program will drive an automatic antenna controller, which is itself a Z-80 microprocessor with 8K of RAM. His ultimate goal is to provide an automatic satellite link for his packet radio bulletin board. He has some interesting challenges ahead, because he must come up with a way to compensate for the Doppler shift on the radio uplink to the satellite.

On the Color Computer Packet Radio Bulletin front, I learned this week that WJ5W has written a BBS for RS-DOS. Better yet, Robert Billson, KC-

OS-9 SOFTWARE from D. P. JOHNSON

L1 UTILITY PAK - Contains 40 useful utilities that run under both level I and II OS-9. Included are a complete set of "wild card" file handling utilities, a disassembler, a disk sector editor, and the MacGen command language compiler. MacGen will allow you to generate many useful command macros in minutes, much more useful than procedure files. Macro source is included for a macro to implement an archival backup type function. **$49.95**

L2 UTILITY PAK - Contains a Level II "printerr" function that also **shows the pathname being searched for** when "not found" or permission type errors occur. Also contains level II software ram disk driver. Ten other utilities included, some useful for level I also . **$39.95**

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You may also contact D. P. Johnson (see left) to answer your technical questions about the DISKMASTER system.

About The One-Liner Contest . . .

THE RAINBOW's One-Liner Contest has now been expanded to include programs of either one or two lines. This means a new dimension and new opportunity for those who have "really neat" programs that simply just won't fit in one line.

Here are the guidelines: The program must work in Extended BASIC, have only one or two line numbers and be entirely self-contained — no loading other programs, no calling ROM routines, no poked-in machine language code. The program has to run when typed in directly (since that's how our readers will use it). Make sure your line, or lines, aren't packed so tightly that the program won't list completely. Finally, any instructions needed should be *very* short.

Send your entry (preferably on cassette or disk) to:

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2WZ, is porting that program to OS-9.

Recently I copied a message from an amateur packet radio operator in Pennsylvania asking for some information about the RS-232 pack and OS-9 terminal programs. I sent him a message, and the next day I had a thank-you message back and a request for more information. Earlier in the week I sent an anniversary message to my parents in Kansas via packet radio. They received a call from a local ham with the message less than 18 hours after I sent it. Hams are using ZIP code forwarding in their packet bulletin board programs to accomplish this magic. There is already a Color Computer version of the *W0RLI* bulletin board available on CompuServe's HamNet. I hope to come up with something for OS-9 soon.

Packet radio communications isn't the only radio mode that can use the services of your Color Computer and OS-9. Jerry Murphy, a ham operator in the Cleveland area, uses *Wiz* to download weather maps from WLO in Atlanta and from CFN in Halifax. He lets *Wiz* capture the maps and write them to disk overnight. In the morning, he prints up the maps and passes them to ships at sea on the 20-meter maritime mobile net. Murphy was the net manager of the Hurricane Net for 25 years before retiring from the job last year.

Shell3 and a Few Tips

Last month we introduced you to *Shell+*. We've used it for almost two months now and don't know how we got along without it. Now, however, there's more — *Shell3* has arrived. You'll find it in a data library on your favorite online SIG.

Kevin Darling and his partners have added `pxd` and `pwd` to the list of features built into *Shell*. They have also made it possible for you to take the name of your current data directory and make it part of your prompt. You do this by typing `$` when you change prompts. `#` prints the process number, `@` prints the current device name, and `$` will show the name of your working data directory.

Another important *Shell3* enhancement is the fact that the program will accept a command line in which you have already typed the parentheses and quotes. This caused a problem with *Shell+* when you ran programs like *Sculptor* that insert these delimiters for you.

During the two months we have used *Shell+*, we have grown quite fond of the append and overwrite features. For example, you can append a favorite listing to an existing file by typing `list favorite >+ FileWithItAll`. Or, if you want to merge a new module into your *Shell* file, you can do so by typing `merge NewModules >+ NewShellFile`. It's a great shortcut!

Here's another! We recently heard about a guy who has set up *Multi-Vue* with icons for all the great CoCo 3 game programs. His 6- and 10-year-old sons now boot up *Multi-Vue* and run their own games — when they want them. No adult supervision required.

Cray Augsburg forwarded a letter to us recently from Ronald W. Wilson, who was looking for a quick lesson in printing from BASIC09. You'll find the secret in the short procedure shown in Figure 1, Ron.

More Tips

One of the problems you run into when you start working with large BASIC09 programs like *KISSDraw* is a shortage of memory in your 64K process area. The problem is also especially

```
procedure DemoPrint

DIM printer:INTEGER

OPEN #printer, "/p": WRITE

(* You now have a path open to the printer

(* and can use it at will.  For example:

PRINT #printer, "Now testing a DMP-1Ø5 printer!"

CLOSE #printer

END
```

Figure 1

TEXTPRO-IV

"The ULTIMATE Color Computer III Word Processing System"

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TEXTPRO IV is the most Powerful Word Processing System available for the OCO-3, designed for speed, flexability and extensive document processing. It is ot like most of the other word processing programs available for the Color omputer. If you are looking for a simple word processor to write letters or other ort documents, and never expect to use multiple fonts or proportional printing, en most likely you'll be better off with one of the other simple word processors. ut, if you want a powerful word processor with extensive document formatting atures to handle large documents, term papers, manuals, complex formatting oblems and letter writing, then TEXTPRO IV is the answer. It works in a tally different way than most word processing programs. It uses simple 2 aracter abbreviations of words or phrases for commands and formatting formation that you imbed directly in your text. There are over 70 different rmatting commands you can use without ever leaving the text your working on. here are no time comsuming and frustrating menu chases, you are in total ntrol at all times. You can display the formatted document on the screen before single word is ever printed on your printer. Including margins, headers, footers, age numbers, page breaks, column formatting, justification, and Bold, Italic, nderline, Double Width, Superscript and Subscript characters.

TEXTPRO IV can even support LASER PRINTERS with proportional fonts, ke a good look at this AD? It was done with TEXTPRO IV on an OKIDATA ASERLINE-6 laser printer!!! All of the character sets used on this AD are roportional, all centering, justification, font selection, and text printing was erformed automatically by TEXTPRO IV.

What you see is what you get!

TEXTPRO IV has 9 Hi-Resolution screen fonts to choose from, with 58 to 212 haracters per line in 225 Resolution, for the best display possible. You can easily atch the width of your printed page to the screen and you can have it utomatically change display widths as you change printer fonts so you can even isplay the "fine print". All of the screen fonts can display, Bold, Italic, Underline, uperscript, Subscript and Double Width characters. When you you want to see hat your printed document will look like, TEXTPRO IV will let you see it on the reen in all its glory, so that, "What you see is what you get".

Standard Commands

TEXTPRO IV has all the document formatting commands you expect in a ord processor and then some. The setup commands include: line length, top argin, bottom margin, page length, page numbering on/off, page format on/off, utomatic word fill on/off and justification left, center, right or full. Some of the ertical control features include: Test for a number of lines left on a page, skip to ext page, set page number, page pause, single and multiple line spacing.

TEXTPRO IV features 3 programmable Header lines that can be centered, left r right justified and one programmable Footer line. There are 3 commands for ontinious, single and paragraph indenting, Center Text, Center Line and Right ustify text with character fill.

Printer & Special Commands

TEXTPRO IV has 8 pre-defined printer & screen commands for Bold, Italic, Double Width, Underline, Subscript, Superscript, Condensed and Double Strike rint. It also has 10 programmable functions that you can use to access intelligent rinter features like: Graphics, variable line spacing, half line feed, horizontal & ertical positioning. There are also 3 other printer commands that allow you to mbed control code sequences anywhere in the text.

There is a Footnote command that will automatically place footnotes at the ottom of the page. Another command allows you to display a message on the reen and input text from the keyboard, to be included in your printed document. here is also a repeat command that allows you to repeat an entire document or art of one, up to 255 times.

Tab Functions

TEXTPRO IV features an elaborate system of tab commands for complete ntrol over column formatting. There are 10 programmable tab stops that can be efined and re-defined at any time. They can be used to: Center over Tab olumn, Right Justify to Tab column, Decimal Align over Tab column, Left ustify to Tab column (Normal Tab) and Horizontal Tab. They can also be used ith a numeric column position for maximum flexibility.

Proportional Fonts & Printing

TEXTPRO IV is the only Color Computer III Word Processing system that gives you Justified Proportion Printing, which can give your documents and letters that professional touch that just isn't obtainable with fixed or mono spaced printing. And just about all printers today support proportional fonts, and with Laser Printers you can get typesetting quality output for just pennies a page. TEXTPRO IV supports up to 9 proportional fonts, with full justification. And, you can even mix mono spaced and proportional fonts for maximum flexability. Even if you don't use proportional printing, you can select between Pica, Elite and Condensed fixed width fonts to get fully justified printing.

Mail Merge and Text Processing Disk Functions

TEXTPRO IV supports several commands that allow you to import data or text from other disk files. They allow you to include information like names and addresses for Mail Merge capability, Import standard paragraphs or other information for Boiler Plate type functions and more. Some of the commands include: Open a file, Field a Record, Read a Record into fielded variables, Read single or multiple lines and Trim spaces from the trailing end of fielded variables.

Another powerful disk function not to be overlooked is the "LIBRARY" command that allows you to include the entire contents of a file in your text. This can be very useful for a great many applications. You can use a Library command to automatically include a standard or optional printer setup command file, or to include standard paragraphs, headers or information created from a spread sheet or any other program. And, for printing very large documents that consist of several files linked together.

Autoexec Startup Files

TEXTPRO IV will automatically load and execute a command text file when it first executes. This allows you to customize the program configuration for your system and printer whenever you startup TEXTPRO IV. You can setup the screen display format, colors, adjust automatic key repeat, printer baud rate, load a set of function keys, load your printers control codes and more.

80 Programmable Function Keys

TEXTPRO IV allows you to have up to 80 function keys with just about any kind of information or command sequences you can imagine. Once programmed, you can have a command sequence execute using a single function key. You can also Save and Load function key sets at any time. So, you can have several sets for different writing tasks or projects, the possibilities are endless. Just think, with a single function key you could, load a disk file, search for and replace all the occurances of a phrase, save the file back to disk, have it processed and printed!

Text Editing

TEXTPRO IV has a powerful, full featured, line oriented screen editor that is faster and more efficient then most editors you've ever worked with. It supports single or multiple line copy and move, global or local search and replace, word and character insert/delete, block delete and much more. It features adjustable automatic key repeat, selectable display foreground and background colors, screen line width and more.

TEXTPRO IV uses fully compatible ASCII formatted files. You can even direct formatted output files to a standard ASCII disk file. It will Load, Save, Append, Kill, Text Process files from disk, Roll part of a file to disk, Get next portion of a file, display a Directory and Backup Ramdisk to & from Floppy disks.

TEXTPRO IV's files are also compatible with spelling checker programs like Spell 'n Fix from Star Kits, a shareware program, available with TEXTPRO IV for your evaluation, just for the asking.

Fully Buffered Keyboard

While many word processing programs are slow and often lose keystrokes. TEXTPRO IV has a fully buffered keyboard that is virtually impossible to out type. Even when it's busy, it will still remember the keystrokes entered. You can enter in commands or whatever, even during insert mode you'll never lose a key.

Professional Word Processing Power

TEXTPRO IV is a powerful tool for both the Casual and Professional Word Processing user. It offers a wide range of features and functions that can satisfy even the most demanding writer. Even though you may not need all of TEXTPRO IV's power and flexability right now, its not a program that you can easily outgrow. As your needs and skills improve, you'll discover that you won't need to go out and buy another word processing program, TEXTPRO IV will already be ready and waiting. No Text Processing program available for the Color Computer III gives you more Text Processing Power than TEXTPRO IV. It can make your writing appear more professional than you ever thought possible. Check around, see what other word processing programs have to offer in terms of power, speed and flexability. When your finished comparing them against TEXTPRO IV, you'll see that it's the only real choice for the Color Computer III.

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Submitting Material To Rainbow

Contributions to THE RAINBOW are welcome from everyone. We like to run a variety of programs that are useful/helpful/fun for other CoCo owners.

WHAT TO WRITE: We are interested in what you may wish to tell our readers. We accept for consideration anything that is well-written and has a practical application for the Tandy Color Computer. If it interests you, it will probably interest lots of others. However, we vastly prefer articles with accompanying programs which can be entered and run. The more unique the idea, the more the appeal. We have a continuing need for short articles with short listings. These are especially appealing to our many beginners.

FORMAT: Program submissions must be on tape or disk, and it is best to make several saves, at least one of them in ASCII format. We're sorry, but we do not have time to key in programs and debug our typing errors. All programs should be supported by some editorial commentary explaining how the program works. We also prefer that editorial copy be included on the tape or disk using any of the word processors currently available for the Color Computer. Also, please include a double-spaced printout of your editorial material and program listing. Do not send text in all capital letters; use upper- and lowercase.

COMPENSATION: We do pay for submissions, based on a number of criteria. Those wishing remuneration should *so state* when making submissions.

For the benefit of those who wish more detailed information on making submissions, please send a self-addressed, stamped envelope (SASE) to: Submission Guidelines, THE RAINBOW, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. We will send you comprehensive guidelines.

Please do not submit material currently submitted to another publication.

acute with BBS programs and others that call in a number of subroutines.

In a recent conversation, Kevin Darling and I wondered why neither of us had thought of the technique that can eliminate most of your problems. It had been right there in the manual all the time — it's a good thing it wasn't a snake. Even though the subroutines like to stick around, there is a way to get rid of them. Use the command `kill` to unlink a procedure from your RunB space — or your BASIC09 space. Here's some sample code:

```
RUN GFX2("clear")
KILL "GFX2"
```

or

```
sub$="gfx2"
RUN sub$
KILL sub$
```

Another question that keeps popping up concerns the C compiler and the fact that the authors hard-coded it to look for the library files on a drive named /D1. To solve the problem, patch `CC1` and `C.PREP` with `Modpatch`, shown in Figure 2.

Also on the C front, Greg Law points out that you must use the new assembler and linker supplied with the Development System when you use the new libraries that come with *Multi-Vue*. The new libraries are stored in a slightly different format that the old linker doesn't recognize. To use the new assembler and linker, delete `c.asm` and `c.link` from your compiler disk, rename `rma` to `c.asm`, and rename `rlink` to `c.link`. Then you can use either the old or new library formats without any trouble.

And while we're handing out tips, Mike Washburn has contributed this one for *Home Publisher* users trying to use a Gemini 10X with the Epson driver. Mike reports he had luck with the following patch. The Hi-Res command, `Esc Z`, should be changed to `Esc z`. The procedure script is shown in Figure 3. After you start *Home Publisher*, set baud rate, no line feeds, and select the Gemini Driver. Thanks, Mike.

```
* MODULE:    cc1

* PROBLEM:   Hard coded for /D1

* SPECIFIC:  Change the /D1 string to /DD

*

modpatch

L CC1

C ØEE6 31 44

V


* MODULE:    c.prep

* PROBLEM:   Hard coded for /DØ

* SPECIFIC:  Change the /DØ string to read /DD instead

*

modpatch

L C.Prep

C 135D 31 44

V
```

Figure 2: `Modpatch`

```
BUILD epson.p

L prn.EpsRX8Ø

C ØØ49 5A 7A * Z -> z

V

<ENTER>

LOAD  /Dx/CMDS/prn.EpsonRX

MODPATCH  epson.p

SAVE  /Dx/CMDS/prn.Gemini  prn.EpsRX8Ø

ATTR  /Dx/CMDS/prn.Gemini  pe  e

PUBLISH [opts]
```

Figure 3

Listing 1: DefsDemo

```
PROCEDURE DefsDemo
 ØØØØ      (* First lets define a data type we can use to create a device window
 ØØ45
 ØØ46      TYPE DW=action:INTEGER; sty,cpx,cpy,szx,szy,fprn,bprn,bdprn

            :BYTE
 ØØ73
 ØØ74      (* Now we need to reserve room in memory for our data
 ØØA9
 ØØAA      DIM path:BYTE
 ØØB1      DIM MakeDW:DW
 ØØBA
 ØØBB      (* The next statement opens a path to a window.
 ØØEA      (* You must make sure that window does not already exist.
 Ø123      (* you can do this by typing "deiniz W12" at the BasicØ9 prompt.
 Ø163
 Ø164      OPEN #path,"/W12":WRITE
 Ø173
 Ø174      (* Now we must initialize the data in our new structure.
 Ø1AC
 Ø1AD      MakeDW.action:=$1B2Ø
 Ø1B9      MakeDW.sty=2
 Ø1C4      MakeDW.cpx=Ø
 Ø1CF      MakeDW.cpy=Ø
 Ø1DA      MakeDW.szx=2Ø
 Ø1E5      MakeDW.szy=12
 Ø1FØ      MakeDW.fprn=Ø
 Ø1FB      MakeDW.bprn=2
 Ø2Ø6      MakeDW.bdprn=1
 Ø211
 Ø212      (* Once we have initialized the data we can put the structure
 Ø24F      (* out on the path we created earlier.
 Ø275
 Ø276      PUT #path,MakeDW
 Ø28Ø
 Ø281      (* In order to see the new window, we must "select" it.
 Ø2B8
 Ø2B9      RUN gfx2(path,"select")
 Ø2CC      PRINT #path,"Hello OS-9 Level II Fans"
 Ø2ED      FOR x:=1 TO 1ØØØØ \NEXT x
 Ø3ØB
 Ø3ØC      (* After we have displayed our new window for a few seconds we must
 Ø34F      (* tell BasicØ9 that we want to return to our original window or the
 Ø393      (* program will lock in the new window.  There is no way for it to
 Ø3D5      (* get any information from the keyboard while the new window is.
 Ø416      (* selected.
 Ø422
 Ø423      RUN gfx2(1,"select")
 Ø434      END
```

A Short Listing

We have included a short listing this month to get you thinking again about data structures in BASIC09 (see Listing 1). We define a new data type for a device window and then show you how you can put it out to a path when you want to open a new window. It's a warm-up for a closer look at *Multi-Vue* and at some of the techniques you will need to write applications using the window manager, `WindInt`. Hopefully, we'll be able to translate several of the C data structures introduced in the *Multi-Vue* manual into BASIC09 data types and show you how you can use them to your advantage.

"A ballot printed on Page 11 of* MOTD *gives you a chance to vote for a new slate of officers."

Another Handy Goldberg Utility

Steve Goldberg, 695 Plainview Road, Bethpage, NY, who sells the fantastic OS-9 utility package *Utilipak Plus* at approximately $2 per utility, is back again this month with a program called `Cmdgen`. It generates OS-9 modules that execute existing programs — or a series of programs — from a short command line. For example:

```
OS9: cmdgen write ENTER
> chd /d1/letters ; edit *
; list * >/p ENTER
```

The keystrokes above will generate a module called `Write`. When you want to write and print a letter, you need only type `write`, followed by the filename you want to use to store the letter. Goldberg suggests that you should use full pathlists when you generate `Cmdgen` modules, as they may be executed from any directory on your computer. If you forget the commands you put in a `Cmdgen` module, you can generate a reminder by typing `os9: cmdgen filename` ENTER.

Enjoy `Cmdgen`, and we'll join you in June for more OS-9 tips and tricks. □

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Listing 2: Cmdgen

```
*******************************************************
*
* CMDGEN  -  (c) 1987 by STEPHEN B. GOLDBERG
*
* Creates OS-9 modules which can execute the indicated
* program or series of programs, with parameter passing.
* A command line is entered at the '>' prompt.  It also
* displays commands contained in the generated modules.
*
* Use: cmdgen <command.name>
*
         ifpl
         use   /dØ/defs/os9defs
         endc
*
         mod   len,name,prgrm+objct,reent+1,entry,dsiz
*
pointer  rmb   2   parameter pointer
modstart rmb   2   start of module
modlen   rmb   11   module length (actual)
modname  rmb   34   module name
ident    rmb   77   cmdgen signature 'DG'
cmdline  rmb   153   command line and CRC
maxsize  equ   .-modstart   maximum module length
         rmb   2ØØ   stack
         rmb   2ØØ   param
dsiz     equ   .
*
name     fcs   /cmdgen/
         fcb   1   edition number
         fcc   /(c)1987 S.B.Goldberg/
*******************************************************
* BEGINNING OF DUMMY MODULE                           *
*******************************************************
dummy    fdb   34765,Ø,13,4481,Ø,13Ø58,23Ø41      *
         fdb   257,257,257,257,257,257,257,257    *
         fdb   257,257,257,257,257,257            *
         fcc   /BY CMDGEN/                        *
*******************************                     *
* TRANSFER CMD. LINE TO BUFFER                      *
*******************************                     *
         leas  2ØØ,u   stack to direct page       *
         stx   <2ØØ   save variable pointer       *
         leax  commands,pcr   command line        *
         leay  2Ø2,u   command buffer             *
tfrloop  lda   ,x+   cmd. line character          *
         cmpa  #$Ød   end of line?                *
         beq   execute   yes, execute commands    *
         cmpa  #'*   wants variable?              *
         beq   setvar   yes, variable to buffer   *
         sta   ,y+   no, character to buffer      *
         bra   tfrloop   do again                 *
*******************************                     *
* INCLUDE VARIABLE IN CMD. LINE                     *
*******************************                     *
setvar   pshs  x   save cmd. line pointer         *
         ldx   <2ØØ   variable address           *
varloop  lda   ,x+   variable character           *
         cmpa  #$Ød   end of variable?            *
         bne   saveit   no, put in buffer         *
         puls  x   get cmd. line pointer          *
         bra   tfrloop   back to transfer         *
saveit   sta   ,y+   save in buffer               *
         bra   varloop   get next var. character  *
*******************************                     *
* EXECUTE COMMAND LINE                              *
*******************************                     *
execute  sta   ,y   terminate commands            *
         leax  <shell,pcr   shell                 *
         ldy   #2ØØ   maximum cmd. length         *
         ldd   #$ØØØ1   type, lang., data size    *
         leau  2Ø2,u   commands address           *
         os9   f$chain   chain Shell              *
         os9   f$exit   exit with error           *
shell    fcs   /shell/                            *
commands equ   *   address of commands            *
dumlen   equ   *-dummy   length of dummy module   *
*******************************************************
* END OF DUMMY MODULE                                 *
*******************************************************
* DISPLAY COMMAND LINE
*******************************
display  leax  modstart,u   module buffer
         ldy   #maxsize   maximum module length
         os9   i$read   get module
         bcs   passerr   exit with error
         ldd   ident   get signature bytes
         cmpd  #$4447   cmdgen signature (DG)?
         bne   other   no, quit with prompt
         leax  cmdline,u   commands address
         lda   #1   standard output path
         bra   cmdout   display commands
*******************************
* CMDGEN ERROR PROMPTS
*******************************
noname   leax  <syntax,pcr   prompt address
errout   lda   #2   standard error path
cmdout   ldy   #15Ø   maximum length
         os9   i$writln   to screen
passerr  bcs   enderr   exit with error
         lbra  noerr   quit
other    leax  <nocmdgen,pcr   prompt address
         bra   errout   prompt to screen and quit
*
syntax   fcc   /Use: cmdgen <command.name>/
         fdb   $Ø7Ød
nocmdgen fcc   /**** Not a CMDGEN module!/
         fdb   $Ø7Ød
prompt   fcc   /> /
*******************************
* CREATE NEW MODULE
*******************************
entry    decb   parameter?
         beq   noname   no, quit with prompt
         stx   pointer   command name pointer
         lda   #read.+exec.   mode
         os9   i$open   open file, if exists
         bcc   display   if yes, display commands
         leax  dummy,pcr   start of dummy module
         leay  modstart,u   start of module buffer
         ldb   #dumlen   length of dummy module
dumloop  lda   ,x+   get byte
         sta   ,y+   put in buffer
         decb   done?
```

One-Liner Contest Winner . . .

You're locked in a high-speed car hurtling through the canyons of doom — can you safely make it through? Use the right and left arrow keys to steer.

The listing:

```
Ø CLS:P=234:V=11:FORW=5TO1STEP-1
:FORN=1TOP:V=V+(RND(3)-2)*((V<>1
)*(V<>(3Ø-W))):PRINT@48Ø,STRING$
(V,128)STRING$(W,32)STRING$(31-V
-W,128):P=P-(PEEK(344)=247)+(PEE
K(343)=247):IFPEEK(P+1Ø24)<>128T
HENPRINT@P,"V";:NEXTN,W:PRINT"YO
U WIN!"ELSEPRINT"CRASH!"
```

Robert M. Dickau
Sacramento, CA

(For this winning one-liner contest entry, the author has been sent copies of both *The Third Rainbow Book of Adventures* and its companion *The Third Rainbow Adventures Tape.*)

```
        bne   dumloop   no, move another byte
        leax  <prompt,pcr   command line prompt
        lda   #1   standard output path
        ldy   #2   two characters
        bsr   write   to screen
        clra   standard input path
        leax  cmdline,u   command line buffer
        ldy   #15Ø   maximum line length
        os9   i$readln   get command line
enderr  bcs   out   exit with error
        cmpy  #1   any entry?
        beq   noerr   no, quit without error
        leay  3+dumlen,y   command line + dummy + CRC
        sty   modlen   put length in module header
        leax  modstart,u   start of module
        ldb   #7   parity counter
        lda   ,x+   get byte
eorloop eora  ,x+   exclusive OR with next byte
        decb   done?
        bne   eorloop   no, do again
        coma   yes, complement
        sta   ,x   save in parity byte
        ldx   pointer   command name
        leay  modname,u   module name buffer
nameloop ldd  ,x+   get name characters
        sta   ,y+   put character in module
        cmpb  #$2Ø   done?
        bhi   nameloop   no, move next character
        ora   #%1ØØØØØØØ   yes, set ms bit
        sta   -1,y   return as last character
        leax  modstart,u   address of module
        ldd   modlen   module length
        subd  #3   less CRC bytes
        tfr   d,y   length to Y register
        pshs  u   save U register
        leau  d,x   address of CRC accumulator
        ldd   #$ffff   initialize
        std   ,u   the CRC
        sta   2,u   accumulator
        os9   f$crc   do count
        bcs   out   exit with error
        com   ,u+   complement
        com   ,u+   the CRC
        com   ,u   bytes
        puls  u   reitieve U register
        ldx   pointer   command name
        ldd   #$Ø62f   mode and attributes
        os9   i$create   create module file
        bcs   out   exit with error
        leax  modstart,u   module address
        ldy   modlen   length of module
        bsr   write   module to disk file
noerr   clrb   clear error flag
out     os9   f$exit   quit
********************************
* OUTPUT SUBROUTINE
********************************
write   os9   i$write   write
        bcs   out   exit with error
        rts   return
*
        emod
len     equ   *
        end
```

Listing 3: Makecmdgen

```
PROCEDURE makecmdgen
 ØØØØ      DIM path,byt:BYTE
 ØØØB      DIM count:INTEGER
 ØØ12      CREATE #path,"/dd/cmds/cmdgen":WRITE
 ØØ2C      (* Level I use "/dØ/cmds/cmdgen" *)
 ØØ4F      FOR count=1 TO 425
 ØØ6Ø        READ byt
 ØØ65        PUT #path,byt
 ØØ6F      NEXT count
 ØØ7A      CLOSE #path
 ØØ8Ø      SHELL "attr /dd/cmds/cmdgen e pe"
 ØØ9D      (* Level I use "/dØ/cmds/cmdgen e pe" *)
 ØØC5      END
 ØØC7      DATA 135,2Ø5,1,169,Ø,13,17,129,128,1,13,2,167,99,1Ø9
 ØØF8      DATA 1ØØ,1Ø3,1Ø1,238,1,4Ø,99,41,49,57,56,55,32,83,46
 Ø129      DATA 66,46,71,111,1Ø8,1ØØ,98,1Ø1,114,1Ø3,135,2Ø5,Ø,Ø,Ø
 Ø15A      DATA 13,17,129,Ø,Ø,51,2,9Ø,1,1,1,1,1,1,1
 Ø18B      DATA 1,1,1,1,1,1,1,1,1,1,1,1,1,1,1
 Ø1BC      DATA 1,1,1,1,1,1,1,66,89,32,67,77,68,71,69
 Ø1ED      DATA 78,5Ø,2Ø1,Ø,2ØØ,159,2ØØ,48,141,Ø,63,49,2Ø1,Ø,2Ø2
 Ø21E      DATA 166,128,129,13,39,26,129,42,39,4,167,16Ø,32,242,52
 Ø24F      DATA 16,158,2ØØ,166,128,129,13,38,4,53,16,32,228,167,16Ø
 Ø28Ø      DATA 32,242,167,164,48,14Ø,17,16,142,Ø,2ØØ,2Ø4,Ø,1,51
 Ø2B1      DATA 2Ø1,Ø,2Ø2,16,63,5,16,63,6,115,1Ø4,1Ø1,1Ø8,236,48
 Ø2E2      DATA 66,16,142,1,21,16,63,137,37,27,22Ø,49,16,131,68
 Ø313      DATA 71,38,24,48,2ØØ,126,134,1,32,5,48,14Ø,19,134,2
 Ø344      DATA 16,142,Ø,15Ø,16,63,14Ø,37,114,22,Ø,2Ø5,48,14Ø,3Ø
 Ø375      DATA 32,237,85,115,1Ø1,58,32,99,1Ø9,1ØØ,1Ø3,1Ø1,11Ø,32,6Ø
 Ø3A6      DATA 99,111,1Ø9,1Ø9,97,11Ø,1ØØ,46,11Ø,97,1Ø9,1Ø1,62,7,13
 Ø3D7      DATA 42,42,42,42,32,78,111,116,32,97,32,67,77,68,71
 Ø4Ø8      DATA 69,78,32,1Ø9,111,1ØØ,117,1Ø8,1Ø1,33,7,13,62,32,9Ø
 Ø439      DATA 39,174,159,Ø,134,5,16,63,132,36,139,48,141,255,11
 Ø46A      DATA 49,66,198,124,166,128,167,16Ø,9Ø,38,249,48,14Ø,224,134
 Ø49B      DATA 1,16,142,Ø,2,141,1Ø9,79,48,2ØØ,126,16,142,Ø,15Ø
 Ø4CC      DATA 16,63,139,37,93,16,14Ø,Ø,1,39,86,49,168,127,16
 Ø4FD      DATA 159,4,48,66,198,7,166,128,168,128,9Ø,38,251,67,167
 Ø52E      DATA 132,158,Ø,49,79,236,128,167,16Ø,193,32,34,248,138,128
 Ø55F      DATA 167,63,48,66,22Ø,4,131,Ø,3,31,2,52,64,51,139
 Ø59Ø      DATA 2Ø4,255,255,237,196,167,66,16,63,23,37,26,99,192,99
 Ø5C1      DATA 192,99,196,53,64,158,Ø,2Ø4,6,47,16,63,131,37,8
 Ø5F2      DATA 48,66,16,158,4,141,4,95,16,63,6,16,63,138,37
 Ø623      DATA 248,57,39,122,123
```

One-Liner Contest Winner . . .

This shortie provides a chart of loan payments. Just enter the principal, number of months you'll be paying on the loan and the interest rate percentage, and the program produces a table of interest and principal payments. The screen displays only 12 months at a time, so press ENTER to see the next 12.

The listing:

```
3 CLS:INPUT"AMT,MNTHS,PCT";A,M,R
:R=R/12ØØ:P=A/((1-(1/((1+R)^M)))
/R):PRINT@35,"BAL      PRIN     IN
T      PAY":FORN=1TOM:S=R*A:A=A-P
+S:PRINTUSING"#####.##  ####.##  #
###.##  ####.##";A,P-S,S,P;:IFN=I
NT(N/12)*12THENINPUT">";A$:PRINT
@64,;:NEXT:ENDELSENEXT:END
```

Stuart Hawkinson
Aloha, OR

(For this winning one-liner contest entry, the author has been sent copies of both *The Third Rainbow Book of Adventures* and its companion *The Third Rainbow Adventures Tape.*)

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ALASKA
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- Lake Havasu City — Book Nook
- Phoenix — TRI-TEK Computers
- Sierra Vista — Livingston's Books
- Tempe — Books, Etc.
- Tempe — Computer Library
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ARKANSAS
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- Ft. Smith — Hot Off the Press Newsstand
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- Marysville — Bookland
- Napa — Bookends Bookstore
- Oakland — DeLauer's News Agency
- Sacramento — Deibert's Readerama
- Sacramento — Tower Magazine
- San Francisco — Booksmith
- San Francisco — Bookworks
- San Francisco — Castro Kiosk
- Santa Monica — Midnight Special Bookstore
- San Jose — Computer Literacy Bookshops
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- Stockton — Harding Way News
- Stockton — Paperbacks Unlimited
- Sunnyvale — Computer Literacy
- Torrance — El Camino College Bookstore

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- Ft. Lauderdale — Clarks Out of Town News
- Ft. Lauderdale — Mike's Electronics Distributor
- Gainesville — Paper Chase
- Jacksonville — Book Co.
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- Panama City — Boyd-Ebert Corp.
- Pensacola — Anderson News Co.
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- Starke — Radio Shack Dealer

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- Tallahassee — DuBey's News Center
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- Bremen — Bremen Electronics/Radio Shack
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IDAHO
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- Moscow — Johnson News Agency

ILLINOIS
- Belleville — Software or Systems
- Champaign — Bookmark
- Chicago — B. Dalton Booksellers
- Decatur — Book Emporium
- Decatur — K-Mart Plaza
- Decatur — Northgate Mall
- East Moline — Book Emporium
- Evanston — Norris Center Bookstore
- Kewanee — Book Emporium
- Lisle — Book Nook
- Lombard — Empire Periodicals
- Newton — Bill's TV Radio Shack
- Paris — Book Emporium
- Peoria — Book Emporium
- Peoria — Sheridan Village
- Peoria — Westlake Shopping Center
- Peoria — Illinois News Service
- Springfield — Book Emporium
- Springfield — Sangamon Center North
- Springfield — Town & Country Shopping Ctr.
- Sunnyland — Book Emporium
- West Frankfort — Paper Place
- Wheeling — North Shore Distributors

INDIANA
- Angola — D & D Electronics
- Angola — Radio Shack
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- Dyer — Miles Books
- Franklin — Gallery Book Shop
- Ft. Wayne — Michiana News Service
- Garrett — Finn News Agency, Inc.
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- Topeka — Town Crier of Topeka, Inc.
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MASSACHUSETTS
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- Brockton — Voyager Bookstore
- Cambridge — Out Of Town News
- Ipswich — Ipswich News
- Littleton — Computer Plus
- Lynn — North Shore News Co.
- Swansea — Newsbreak, Inc.

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- Birmingham — Border's Book Shop
- Durand — Robbins Electronics
- E. Detroit — Merit Book Center
- Harrison — Harrison Radio Shack
- Hillsdale — Electronics Express/Radio Shack
- Holland — Fris News Company
- Lowell — Curt's Sound & Home Arcade Center
- Muskegon — The Eight Bit Corner
- Niles — Michiana News Service
- Perry — Perry Computers
- Riverview — Riverview Book Store
- Roseville — New Horizons Book Shop

MINNESOTA
- Burnsville — Shinder's Burnsville
- Crystal — Shinder's Crystal Gallery
- Edina — Shinder's Leisure Lane
- Minneapolis — Shinder's (2 Locations)
- Minnetonka — Shinder's Ridge Square
- Roseville — Shinder's Roseville
- St. Paul — Shinder's Annex
- St. Paul — Shinder's Maplewood
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MISSOURI
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NEBRASKA
- Lincoln — Nebraska Bookstore
- Omaha — Nelson News

NEVADA
- Carson City — Bookcellar
- Las Vegas — Hurley Electronics
- Las Vegas — Steve's Books & Magazines

NEW HAMPSHIRE
- Keene — Radio Shack Associate Store
- Manchester — Bookwrights
- West Lebanon — Verham News Corp.

NEW JERSEY
- Atlantic City — Atlantic City News Agency
- Cedar Knolls — Village Computer & Software
- Clinton — Micro World II
- Pennsville — Dave's Elect. Radio Shack
- Rockaway — Software Station

NEW MEXICO
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- Albuquerque — Page One Newsstand
- Santa Fe — Downtown Subscription

NEW YORK
- Amherst — Village Green-Buffalo Books
- Brockport — Lift Bridge Book Shop, Inc.
- Brooklyn — Cromland, Inc.
- Elmira Heights — Southern Tier News Co., Inc.
- Fredonia — On Line: Computer Access Center
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- New York — 200 Park Ave., (Pan Am #1)
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	Software City
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	World Wide News
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NORTH CAROLINA

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Chapel Hill	University News & Sundry
Charlotte	Newsstand Int'l
Hickory	C^2 Books & Comics
Jacksonville	Michele's, Inc.
Kernersville	K & S Newsstand
Marion	Boomers Rhythm Center
Winston-Salem	K & S Newsstand (3 Locations)
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Chattanooga	Anderson News Co.
	Guild Books & Periodicals
Dickson	Highland Electronics
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	Davis-Kidd Bookseller
Memphis	Computer Center
Nashville	Davis-Kidd Booksellers
	Misko's Place
	R.M. Mills Bookstore
Smyrna	Delker Electronics

TEXAS

Big Spring	Poncho's News
Desoto	Maxwell Books
Elgin	The Homing Pigeon
Harlington	Book Mark

UTAH

Provo	Valley Book Center

VIRGINIA

Danville	K & S Newsstand
Hampton	Benders
Norfolk	I-O Computers
	Turn The Page
Richmond	Volume I Bookstore

WASHINGTON

Port Angeles	Port Book & News
Seattle	Adams News Co., Inc.
	Bulldog News
Tacoma	B & I Magazines & Books
	Nybbles 'N Bytes

WEST VIRGINIA

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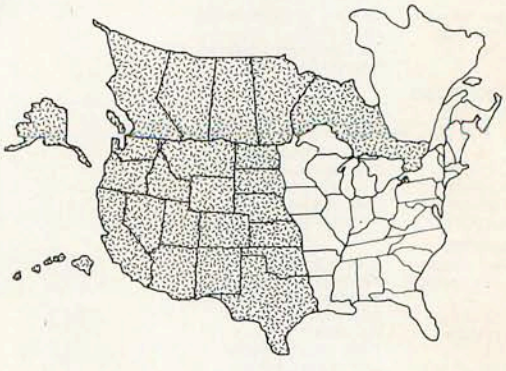

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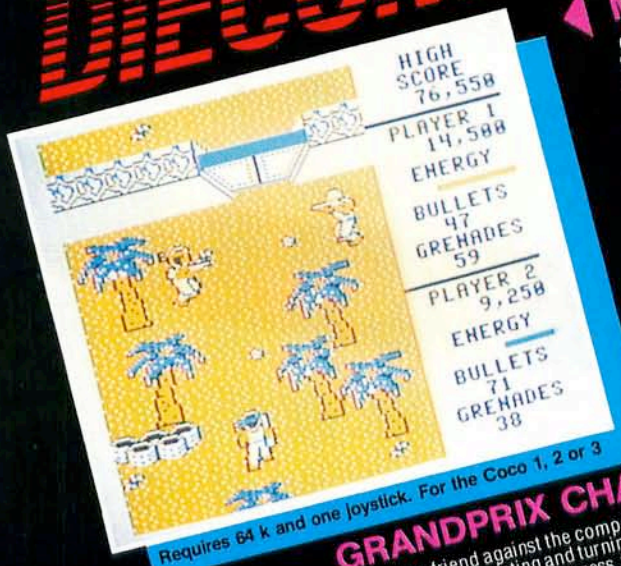

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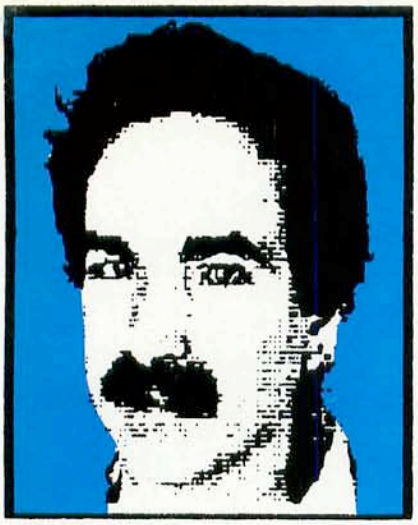

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